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Announcements & Index

8 April 9, 1982

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U.S. DEPARTMENT OF COMMERCE **Malcolm Baldrige, Secretary of Commerce**
NATIONAL TECHNICAL INFORMATION SERVICE

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GOVERNMENT REPORTS

Announcements & Index

Volume 82, Number 8 April 9, 1982

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* Committee on Scientific and Technical Information

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SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

NTIS Subject Category
NTIS Subcategory
NTIS order number Availability/Price codes
Corporate or Performing Organization

Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A108 338/5 PC **A07**/MF **A01**
Air Force Academy, CO.
Air Force Academy Aeronautics Digest - Fall/Winter 1980.
Final rept.,
A. M. Higgins, E. J. Jumper, J. M. Kempf, and B. J. Gregory. May 81, 148p Rept no. USAFA-TR-81-4

This report includes technical papers in the specific areas of aerodynamics, propulsion, experimental instrumentation, biomechanics, engineering education, and aeronautical history. Partial Contents include: Canard Wake Measurement and Description; Examining a Rule of Thumb for the Relation between Camber and Zero-Lift Angle of Attack; Experimental Aerodynamic Effects of Three-Dimensional Square Cross-Section Missiles at Moderate Angles of Attack; Calibration of Seven-Hole Probes Suitable for High Angles in Subsonic Compressible Flows; Development of Design Criteria for Rapid Pre-Ejection Crew Restraint of Upper Torso; Si Units (Mass, Weight) Let's Do It Right, and The Early History of the Jet Engine.

AD-A108 416/9 PC **A05**/MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
An Experimental Investigation of Rise Times of Very Weak Shock Waves.
Technical note,
Ole Holst-Jensen. Mar 81, 90p UTIAS-TN-229, AFOSR-TR-81-0781
Grant AFOSR-77-3303

The present work has as its main contribution the development of the experimental technique of using exploding wires to generate N-waves. Consideration is also given to N-waves generated by sparks, in the UTIAS Travelling-Wave Sonic-Boom Simulator and from supersonic aircraft. (Author)

N82-13044/4 PC**$5.00**
National Aeronautics and Space Administration, Washington, DC.

Aeronautical Engineering: A Continuing Bibliography with Indexes, Supplement 140.
Oct 81, 118p NASA-SP-7037(140)

This bibliography lists 386 reports, articles, and other documents introduced into the NASA scientific and technical information system in September 1981.

N82-13045/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
An Approximate Analytical Method for Vortex-Lift and Center of Pressure on the Slender Wing.
Y. Xieyuan. Dec 81, 12p NASA-TM-83198, L-14848
Transl. into English from Acta Aeron. Et Astronautica Sinica (China), V. 1, No. 1, 1980 p 1-6.

A simplified approximate analytical method for predicting vortex lift and center of pressure on slender wings is presented. Two empirical corrections are proposed. The method is compared with experimental data and gives accurate estimates.

N82-13047/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Wind-Tunnel Investigation of the Tail-Spoiler Concept for Stall-Prevention on General Aviation Airplanes.
D. R. Satran. Nov 81, 40p NASA-TM-83208, L-14703

The longitudinal aerodynamic characteristics of a full scale, single engine general aviation airplane equipped with an angle of attack limiting concept which used a tail mounted spoiler for stall prevention were investigated. The tail spoiler was deployed as a nonlinear function of changes in angle of attack in a narrow angle of attack range immediately preceding the stall angle. Spoiler deployment produced a nose down moment which limited the nose up trim capability of the elevator to an angle of attack below the stall angle of the airplane. The tail spoiler system produced significant increases in longitudinal stability and elevator hinge moments near the stall. The effects of power, flaps, and center of gravity position are also studied.

N82-13106/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Force and Moment, Flow-Visualization, and Boundary-Layer Tests on a Shuttle Orbiter Model at Mach 6.
R. L. Calloway. Dec 81, 25p NASA-TP-1952, L-14782

Force and moment, flow visualization, and boundary layer state tests were conducted using two 0.004 scale shuttle orbiter models. The force and moment tests were conducted for an angle of attack range from 20 to 40 deg and for Reynolds numbers based on reference length from 0.4 million to 3.6 million. Schlieren photographs were obtained for each angle of attack and Reynolds number. The boundary layer state tests, which were conducted using hot film sensors mounted in a separate model, were conducted over the same range of conditions as the force tests. Test results were combined to show that changes in the boundary layer on a typical hypersonic force test model affect measurement of the axial force coefficient and that the state of the local boundary layer is important for interpreting hypersonic aerodynamic test results.

N82-13107/9 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Wind-Tunnel Investigation of the Effects of Blade Tip Geometry on the Interaction of Torsional Loads and Performance for an Articulated Helicopter Rotor.
W. T. Yeager, and W. R. Mantay. Dec 81, 64p NASA-TP-1926, AVRADCOM-TR-81-B-5
Contract DA PROJ. 1L2-62209-AH-76
Prepared in cooperation with Army Aviation Research and Development Command, Hampton, VA.

The Langley transonic dynamics tunnel was used to determine the degree of correlation between rotor performance and the dynamic twist generated by changes in blade tip geometry using an articulated rotor with four different tip geometries at advance ratios of 0.20, 0.30 and 0.35. Based on the data obtained, it is concluded that: (1) there appears to be no strong correlation between blade torsion loads and rotor performance prediction; (2) for a given rotor task at each advance ratio investigated, both the azimuthal variation of torsional moment and the mean torsional moment at 81% radius are configuration dependent; (3) reducing the nose down twist on the advancing blade appears to be more important to forward flight performance than increasing the nose down twist on the retreating blade; (4) the rotor inflow model used was important in predicting the performance of the adaptive rotor; and (5) neither rigid blade solidity effects, inflow environment, nor blade torsion loads can be used alone to accurately predict active rotor performance.

N82-13108/7 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Crossflow Effects on Steady and Fluctuating Pressures on an Ogive-Cylinder Cone-Frustum Model in Supersonic Separated Flow.
J. B. Dods, Jr., and C. F. Coe. Nov 81, 58p NASA-TP-1951, A-8563
Contract NAS2-10139

Wind-tunnel tests were conducted on an ogive-cylinder model with two axisymmetric protuberances having cone frustum angles of cone = 23 deg and 45 deg that were used to generate detached shock waves and the resulting separated flow areas downstream of the shock. The tests were conducted in a 9 by 7 foot supersonic wind tunnel at a free-stream Mach number of 2.0 and at Reynolds numbers of 1.5 x 1 million and 3.9 x 1 million, based on body diameter. The model had an afterbody fineness ratio of 8.3, and the ogive nose had a fineness ratio of 3.0. Two characteristics of the fluctuating pressures in surface vortex flows that result from the crossflow component, (velocity along the tunnel longitudinal axis free stream angle of attack), in combination with changes in the longitudinal pressure gradient were measured: (1) the broadband, rms-pressure coefficients and (2) the power spectral densities. Measurements are presented for various flow regions on the model such as the attached turbulent boundary layer, the detached frustum shock wave, and separated flow areas. The results indicate that the pressure fluctuations around or in the neighborhood of the foci of the vortex flows had broadband intensities and power spectral densities nearly identical to the levels previously measured in separated-flow regions at angles of attack of 0 deg.

N82-13115/2 PC **A04**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.).
A Calculation Method for Slender Wing-Body Configurations in Supersonic Flow at High Angles of Attack Ein Berechnungsverfahren fuer Schlanke Fluegel-Rumpfanordnungen im Ueberschall bei Hohen Anstellwinkeln.
D. Nikolitsch. 1979, 58p BMVG-FBWT-79-15
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

An analysis which determines nonlinear force and pitching moment characteristics of slender bodies and slender wing-body configurations at high angles of attack in supersonic flow is presented. The linear coefficients of the body are calculated by means of a singularity distribution along the body axis. The nonlinear coefficients are determined by a method based on Wardlaw's multivortex model which is modified so that it is applicable at Mach 1. The wing characteristics are calculated with the Huerlimann prediction method; this method is limited to slender, tapered wing planforms. The mutual interference of wing and body is accounted for by Nielsen interference factors. The range of application of the analysis is exemplified by sample calculations.

N82-13118/6 PC **A08**/MF **A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Investigation of the Vortex Field Generated by an Airfoil Model in a Wind Tunnel, Using Ultrasonic Pulses.
R. H. Engler, and D. W. Schmidt. 1979, 155p MPIS-MITT-69, ISSN-0374-1257
In German; English Summary.

The development of the tip vortex generated by a rectangular wing of aspect ratio five in the region closely behind the wing was investigated by means of ultrasonic pulses in a 3m x 3m wind tunnel. This technique does not perturb the flow field and is based on the time-of-flight variations of the ultrasonic pulses due to acceleration or deceleration by tail or head winds. Vortex position, core diameter, circumferential velocity, and circulation were measured as a function of angle of attack and of main flow velocity up to 40 m/sec at Reynolds numbers up to 400,000. The data evaluation is aided by a theoretical model based on a Hamel-Oseen vortex. The influence of spoiler configurations on the tip vortex and the near flow field upstream of the wing were also investigated.

N82-13119/4 PC **A04**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Goettingen (Germany, F.R.).
An Analytical and Experimental Study of the Steady and Unsteady Airloads on a Wing with Oscillating Control Including a Streamlined Gap.
W. Geissler. Feb 81, 52p DFVLR-FB-81-18

A wing section with oscillation control was studied in a 3m low speed wind tunnel. In order to simulate a realistic configuration, the gap between wing and control surface was streamlined. A modified analytical surface singularity method, taking into account the exact boundary conditions and Bernoulli equation, was developed. With this method the problem is handled as an inteference problem between two lifting bodies with two Kutta conditions. Local lift distributions obtained from both experiment and theory are compared for a variety of parameters, such as aspect ratio, section incidence, steady flap deflection, oscillation frequency, wake location, and open/closed slot. Outside the gap the correspondence between the exact potential theory and the experimental data is excellent. Deviations within the gap region are attributed to viscous effects.

N82-13147/5 PC **A06**/MF **A01**
Stanford Univ., CA. Dept. of Aeronautics and Astronautics.
Design for Active and Passive Flutter Suppression and Gust Alleviation.
Ph.D. Thesis.
M. Karpel. Nov 81, 117p NASA-CR-3482
Contract NGL-05-020-243

Analytical design techniques for active and passive control of aeroelastic systems are based on a rational approximation of the unsteady aerodynamic loads in the entire Laplace domain, which yields matrix equations of motion with constant coefficients. Some existing schemes are reviewed, the matrix Pade approximant is modified, and a technique which yields a minimal number of augmented states for a desired accuracy is presented. The state-space aeroelastic model is used to design an active control system for simultaneous flutter suppression and gust alleviation. The design target is for a continuous controller which transfers some measurements taken on the vehicle to a control command applied to a control surface. Structural modifications are formulated in a way which enables the treatment of passive flutter suppression system with the same procedures by which active control systems are designed.

N82-13396/8 PC **A03**/MF **A01**
Technische Univ., Munich (Germany, F.R.). Inst. Luft- und Raumfahrt.
Influence of Wall Roughness, Adverse Pressure Gradient and Heat Transfer on Wall Shear Stress Measurements with Preston Tubes.
W. Nitsche, and C. Haberland. 1980, 45p ILR-50, ISSN-0341-0587
In German; English Summary.

Correction functions to the Preston tube calibration curve, accounting for wall roughness, adverse pressure gradient, and heat transfer, were derived, allowing quantitative measurements of local wall shear stress and skin friction in boundary layer flows modified by these parameters. The correction functions were calculated from analytical boundary layer laws and are compiled in tables. Experiments in rough tubes, on plates with positive pressure gradients, and on heated and cooled surfaces confirm theoretical results.

1B. Aeronautics

AD-A108 420/1 PC **A05**/MF **A01**
Aeronautical Systems Div., Wright-Patterson AFB, OH.

A Digital Simulation Program Describing the Motion of an Aircraft Undergoing Engine Failure During Its Takeoff Ground Roll.
Final rept. Jun 80-Mar 81,
Michael J. Miedlar. Sep 81, 77p Rept no. ASD-TR-81-5030

This report presents a non-interactive 'MIMIC' program developed to generate the time history of an aircraft undergoing an engine failure during its ground roll. The program calculates the forces and moments acting on the aircraft, and uses MIMIC's implicit integration routine to track its motion. The equations and assumptions used are presented and discussed. This report also lists the program and delineates its functions. (Author)

N82-13148/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Limited Evaluation of an F-14A Airplane Utilizing an Aileron-Rudder Interconnect Control System in the Landing Configuration.
W. W. Kelley, and E. K. Enevoldson. Dec 81, 39p
NASA-TM-81972, L-14756

A flight test was conducted for preliminary evaluation of an aileron-rudder interconnect (ARI) control system for the F-14A airplane in the landing configuration. Two ARI configurations were tested in addition to the standard F-14 flight control system. Results of the flight test showed marked improvement in handling qualities when the ARI systems were used. Sideslip due to adverse yaw was considerably reduced, and airplane turn rate was more responsive to pilot lateral control inputs. Pilot comments substantiated the flight data and indicated that the ARI systems were superior to the standard control system in terms of pilot capability to make lateral offset corrections and heading changes on final approach.

N82-13150/9 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN. School of Aeronautical and Engineering Sciences.
Interactive Aircraft Flight Control and Aeroelastic Stabilization.
Interim Report.
T. A. Weisshaar, and D. K. Schmidt. 31 Oct 81, 39p
NASA-CR-165036
Contract NAG1-157

Several examples are presented in which flutter involving interaction between flight mechanics modes and elastic wind bending occurs for a forward swept wing flight vehicle. These results show the basic mechanism by which the instability occurs and form the basis for attempts to actively control such a vehicle.

N82-13621/9 PC **A05**/MF **A01**
FWG Associates, Inc., Tullahoma, TN.
Feasibility Study of a Procedure to Detect and Warn of Low Level Wind Shear.
Final Report.
B. S. Turkel, P. A. Kessel, and W. Frost. Nov 81, 82p
NASA-CR-3480, M-365
Contract NAS8-33458

A Doppler radar system which provides an aircraft with advanced warning of longitudinal wind shear is described. This system uses a Doppler radar beamed along the glide slope linked with an on line microprocessor containing a two dimensional, three degree of freedom model of the motion of an aircraft including pilot/autopilot control. The Doppler measured longitudinal glide slope winds are entered into the aircraft motion model, and a simulated controlled aircraft trajectory is calculated. Several flight path deterioration parameters are calculated from the computed aircraft trajectory information. The aircraft trajectory program, pilot control models, and the flight path deterioration parameters are discussed. The performance of the computer model and a test pilot in a flight simulator through longitudinal and vertical wind fields characteristic of a thunderstorm wind field are compared.

1C. Aircraft

AD-A108 131/4 PC **A03**/MF **A01**
Army Aeromedical Research Lab., Fort Rucker, AL.
Vibration Levels in Army Helicopters--Measurement Recommendations and Data.
Final rept.,
John C. Johnson, and David B. Priser. Sep 81, 35p Rept no. USAARL-81-5

Surveys on vibration levels found in currently fielded helicopters were used to prepare a comparative summary of vibration exposure levels at crew stations and of the test methods used to measure these levels. This effort was initiated at the request of the Air Standardization Coordinating Committee (ASCC) Working Party 61 and because of the wide variety of methods used in data capture and instrumentation documentation. Sources of the literature reviewed included technical reports of U.S. Government agencies and papers in open literature. Articles were reviewed based upon three criteria: (1) quantitative description of vibration in currently fielded U.S. Army rotary winged aircraft, (2) article contents are unclassified and available for publication in open literature, (3) article describes human exposure levels of aircraft vibration. (Author)

AD-A108 145/4 PC **A02**/MF **A01**
Boeing Military Airplane Co., Seattle, WA.
Cast Aluminum Primary Aircraft Structure,
C. K. Gunther. Dec 79, 15p
Contract F33615-76-C-3111

A A357 cast aluminum alloy forward fuselage pressure bulkhead has been developed and manufactured for the AMST-YC-14 aircraft. This work was performed by The Boeing Company under the direction of the AFFDL/AFML-AMS/ADP office as part of the Cast Aluminum Structures Technology (CAST) contract. The purpose of the program is to demonstrate that aluminum castings can be used for primary aircraft structural components with no weight penalty and a minimum of 30% cost savings. To assist in the development of the design and in the demonstration of the structural integrity of the cast bulkhead, an extensive test program was undertaken to study the static strength, and fatigue and fracture characteristics of A357-T6 cast aluminum alloy. Static mechanical properties, S-N data, and crack growth and fracture toughness data were generated. The integrity of the design was demonstrated by analysis. The concepts of linear fracture mechanics were applied in the damage tolerance analysis. No casting factors were used in the design and analysis. Data were collected on the effects of defects commonly occurring in castings. Test coupons were removed from castings containing defects and subjected to repeated loads. The shift of the S-N curve for A357 aluminum alloy was determined for a number of typical defects. The effects of defects were also expressed as equivalent initial flaws assumed to be located at the defect site. Repair/no repair decisions for the productimn castings were based on an evaluation of the load environment and the effect of the defect on fatigue and fracture properties.

AD-A108 246/0 PC **A25**/MF **A01**
Bell Helicopter Textron, Fort Worth, TX.
Rotorcraft Flight Simulation Computer Program C81 with DATAMAP Interface. Volume I. User's Manual.
Final rept. Jul-Dec 79,
James R. Van Gaasbeek. Oct 81, 576p BHT-699-099-111-VOL-1, USAAVRADCOM-TR-80-D-38A
Contract DAAK51-79-C-0015
Supersedes Rept. nos. USAAMRDL-TR-76-41A, B, C and USARTL-TR-77-54A, AD-A079 631, USARTL-TR-77-54B, AD-A079 632, and USARTL-TR-77-54C, AD-A077 345. See also Volume 2, AD-A108 294.

This report documents the current version in the C81 family of rotorcraft flight simulation programs developed by Bell Helicopter Textron. This current version of the digital computer program is referred to as AGAP80. The accompanying program for calculating fully-coupled rotor blade mode shapes is called DNAM05, and an associated rotor wake program is called AR9102. The AGAP80 version of C81 was developed by adding some analytical features to the AGAJ76 version, and including the ability to generate Data Transfer Files for use by the File Creation Program of DATAMAP. The User's Manual, contains the detailed information necessary for setting up an input data deck and interpreting the computed data.

AD-A108 262/7 PC **A21**/MF **A01**
Boeing Military Airplane Co., Seattle, WA.
An Improved Ground Vibration Test Method. Volume I. Research Report.
Final rept. Jul 78-Sep 80,
David W. Gimmestad, Roman F. Michalak, David L. Brown, Randall J. Allemang, and Carl S. Doherty. Sep 80, 492p AFWAL-TR-80-3056-VOL-1
Contract F33615-77-C-3059
Prepared in cooperation with Cincinnati Univ.

Research was conducted to develop an improved method for ground vibration testing of airplanes. The resulting method, a single point excitation-frequency response analysis method, utilizes the computer, modern electronic equipment, developments in vibration testing theory and improvements in mechanical system design to accomplish ground vibration tests at greatly reduced cost while significantly improving accuracy. A demonstration ground vibration test was conducted using the improved method on an A-10 Airplane. (Author)

AD-A108 294/0 PC **A12**/MF **A01**
Bell Helicopter Textron, Fort Worth, TX.
Rotorcraft Flight Simulation Computer Program C81 with Datamap Interface, Volume II. Programmer's Manual.
Final rept.,
P. Y. Hsieh. Oct 81, 264p BHT-699-099-111-VOL-2, USAAVRADCOM-TR-80-D-38B
Contract DAAK51-79-C-0015
Supersedes Rept. nos. USAAMRDL-TR-76-41A, B, C.

This report documents the current version in the C81 family of rotorcraft flight simulation programs developed by Bell Helicopter Textron. This current version of the digital computer program is referred to as AGAP80. The accompanying program for calculating fully coupled rotor blade mode shapes is called DNAM05, and an associated rotor wake program is called AR9102. The AGAP80 version of C81 was developed by adding some analytical features to the AGAJ76 version and including the ability to generate Data Transfer Files for use by the File Creation Program of DATAMAP. An overview of the computer program capabilities and the principal mathematical models incorporated in the program are given in Volume I of the documentation for the AGAJ76 version of the program. Volume I, the User's Manual, contains detailed information necessary for setting up an input data deck and interpreting the computed data. Volume II, includes a catalog of subroutines and a discussion of programming considerations.

AD-A108 354/2 PC **A16**/MF **A01**
Rockwell International, Columbus, OH. Columbus Aircraft Div.
XFV-12A Diagnostic and Development Program.
Summary rept. Jan 79-May 81,
P. M. Bevilaqua, and C. P. Combs. Nov 81, 367p
Rept no. NR81H-50
Contract N00019-73-C-0053

The purpose of this report is to document the activity during the XFV-12A thrust augmenter development program conducted from May 1979 to June 1981. The diagnostic tests also indicated that a major source of performance deficiency could be attributed to feed duct/augmenter component interface problems rather than the basic augmenter configuratiion. The interface problems seriously affected both the isolated performance and flow quality of the primary augmenter nozzles resulting in significantly lower levels of augmentation than originally expected. After an extensive review of both the tethered hover tests and the wing diagnostic investigations by both Navy and Rockwell International personnel, a remedial program which is the subject of this report was initiated. The primary objective of this program was to systematically improve the performance of the XFV-12A aircraft's thrust augmenter lift systems. Major emphasis was placed not only on correcting the flow deficiencies identified during the wing augmenter diagnostic investigations, but to identify and incorporate any improvements in the augmenter design which would increase its performance potential.

AD-A108 463/1 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
Potential Reductions in Aircraft Operation and Maintenance Costs by Using Thrust Computing Support Equipment.
27 Oct 81, 17p Rept no. GAO/PLRD-82-4
Report to the Honorable Joseph P. Addabbo, Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives.

This report addresses the evaluation of thrust measuring equipment. We interviewed Air Force officials and contractor representatives, reviewed documentation

pertaining to the key events in the evaluation of the thrust computing system program, reviewed test data and analyses by Air Force and contractor engineers, and observed the operation of the thrust computing system. Our analyses show that the accurate measurement and setting of thrust for installed jet engines is of vital importance not only for aircraft readiness and safety but also for operation and maintenance cost reductions. Although test results indicate that a system is available that can perform such measurements, the services have not been using it. The Air Force has conducted extensive tests that will measure thrust for installed J85-5 engines, but has not implemented a system. The Navy has not performed any tests to determine whether its aircraft jet engines might benefit from such a system.

AD-A108 524/0 PC **A08**/MF **A01**
Lockheed-Georgia Co., Marietta.
Analytical Study of Cockpit Information Requirements.
Final rept. Oct 79-Nov 80,
J. D. Caldwell, and T. G. Jones. Apr 81, 165p
LG80ER0200, FAA/RD-81/4
Contract DOT-FA79WA-4368

An assessment is made of cockpit information requirements likely to be imposed on aircraft in the next fifteen years as a result of improvements in the ATC system and in aircraft design. These requirements are analyzed by work centers and include flight control, navigation, collision avoidance, flight management, communications, caution/warning and monitoring, and checklist functions. From a baseline of current requirements and technology, the application of new requirements and technology is analyzed. Three aircraft are hypothesized representing three time periods of technical development. The purpose is to investigate the impact of future ATC changes on differently equipped aircraft.

AD-A108 597/6 PC **A03**/MF **A01**
Institute for Defense Analyses, Arlington, VA. Systems Evaluation Div.
C-5A Austere Airfield Operational Utility Evaluation Phase II - Operation on Unpaved Soil Surfaces Following Rainfall.
Final rept.,
Waldemar O. Breuhaus. Oct 81, 46p IDA-P-1621, IDA/HQ-81-23896, SBI-AD-E500 466
Contract MDA903-79-C-0018
See also Phase I, AD-C024 341.

During the summer of 1980 and the winter of 1980-1981, an Operational Utility Evaluation (OUE) was conducted to determine operating characteristics of the C-5A airplane when taxiing or being towed and off-loaded on unpaved soil surfaces and on snow-covered surfaces. Subsequent to the successful completion of those tests, questions arose concerning the effects of rainfall that wets otherwise adequate bare soil areas to a significant depth. Tests with simulated rainfall of various amounts applied by agricultural sprinkler systems were conducted at March AFB, California, during July 1981. The airplane performed well, though it approached its performance limits in the most severe test conditions. Difficulties were encountered in arriving at a sprinkler system configuration reasonably approximating naturally occurring rainfall, and in arriving at a single simple descriptor to properly characterize the strength of soil in such a complex situation.

AD-A108 610/7 PC **A08**/MF **A01**
Lockheed-Georgia Co., Marietta. Structures Technology Div.
Cavity Oscillation in Cruise Missile Carrier Aircraft.
Final rept. Aug 79-Apr 81,
Harold W. Bartel, and James M. McAvoy. Jun 81, 151p LG81ER0156, AFWAL-TR-81-3036
Contract F33615-79-C-3207

This report discusses cavity oscillation in general, and particularly the problem of cavity oscillation in the missile bays of cruise missile carrier aircraft during missile launch. The missile bay configurations analyzed ranged from the complete interior volume of a large transport aircraft, to the bomb bay of a conventional bomber. All of the carrier aircraft cases evaluated were conceptual; no specific airframe models or manufacturers are identified. The principles and technology presented are not limited to missile bays; they are applicable to general cavities having free-stream flow velocities above Mach 0.4. It is observed that above Mach 0.4 the pressure fluctuations in an oscillating cavity may arise from: (a) sustained periodic pressure fluctuations in the aperture shear layer that radiate noise into the cavity; and (b) sustained periodic pressure fluctuations in the aperture shear layer that couple with the cavity volume acoustic modes (this generally produces by far the most intense cavity oscillation). Theoretical/empirical techniques are presented for predicting oscillatory frequency, pressure level, pressure spatial distribution in the cavity, and the degree of alleviation achievable with suppressors. The information is based on extensive experimentation with subscale models having apertures of 2 to 6 in. in a cold air wall-jet flow facility. A bibliography is included containing 145 listings. (Author)

AD-A108 649/5 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
A-7E Software Module Guide.
Memorandum rept.,
K. H. Britton, and D. L. Parnas. 8 Dec 81, 36p Rept no. NRL-MR-4702

This document describes the basic organization of NRL's version of the A-7E onboard flight software. The report describes a structure in which modules have been designed in accordance with the Information Hiding Principle. Because of the larger number of modules that result when this principle is applied, the modules are arranged in a hierarchy. The hierarchy should simplify the task of a maintenance programmer assigned to make a specific modification. The document also describes the principles used in the design of the software. It is intended to be useful both as a guide to the A-7E software and as a model for those developing other software systems. (Author)

AD-A108 753/5 PC **A05**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
A Compilation of Stress Intensity Factor Solutions for Flawed Fastener Holes.
Final rept. Jun 78-Aug 81,
A. F. Grandt, Jr., and T. E. Kullgren. Nov 81, 86p Rept no. AFWAL-TR-81-4112

Several sets of stress intensity factor solutions are provided for through-the-thickness, corner, and surface flawed holes. Results are given for both remote tensile and crack face pressure loading. It is suggested that the crack face pressure solutions can be used with the linear superposition method to analyze many other practical crack problems. The superposition technique is demonstrated with several sets of example calculations. (Author)

N82-13065/9 PC **A22**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Aerodynamics of Power Plant Installation.
Sep 81, 510p AGARD-CP-301, ISBN-92-835-0301-5
In English and French. Proc. Of Conf. Held in Toulouse, 11-14 May 1981.

No abstract available.

N82-13111/1 PC **A03**/MF **A01**
Indian Inst. of Science, Bangalore. Dept. of Aeronautical Engineering.
Force Measurements on a Reflex Cambered delta Wing.
V. S. Holla, M. D. Aravamudhan, and P. J. Rao. 23 Jul 81, 35p LOG-C4073
Backup Document for Aiaa Synoptic Scheduled for Publication in Journal of Aircraft in Mar. 1982.

The effect of reflex spanwise camber on the lift, drag, lift to drag ratio and the pitching moment coefficients were studied on a reflex spanwise cambered slender delta wing with conical camber and a plane delta wing. At subsonic speeds, both with and without yaw, the cambered wing has less lift at a given incidence and higher lift to drag ratio at a given lift than the plane wing. At supersonic speeds, both lift at any incidence and lift to drag ratio at a given lift coefficient were less on the cambered wing than on the plane wing. Flow visulization studies at subsonic speeds show that the spanwise camber both delays and reduces the intensity and extent of the flow separation along the leading edges At supersonic speeds, at the design Mach number and incidence, there is good agreement between results from theory and experiment. The center of pressure position of the cambered wing is ahead of that of plane wing at subsonic speeds while the reverse is true at supersonic speeds.

N82-13116/0 PC **A09**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Flugzeuge.
Final Report on the Fuefo-4 Major Theme: Interference Drag with Airframe/Engine Integration on Fighter Aircraft Abschlussbereicht Zum Ruefo-4 Rahmenthema 'Interferenzwiderstand bei der Zellen-/Treibwerksintegration von Kampfflugzeugen'.
Final Report.
H. L. Weinreich, and R. Smyth. 1979, 182p BMVG-FBWT-79-20
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

Theoretical and experimental (wind tunnel) studies of engine nozzle characteristics as well as of engine/airframe aerodynamic interaction are summarized. Results significant to fighter aircraft configuration optimization are identified. Wind tunnel experiment design is also critically assessed. Results emphasized concern: experimental data for parameters influencing afterbody drag; theoretical and construction concepts of variable 'CONDI' nozzles; theoretical methods for the correction of wind tunnel data; the synthesis of inlet drag; and investigations of jet decay structures.

N82-13117/8 PC **A04**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.).
Contributions to the Aerodynamics of Wing-Body Configurations in the Nonlinear Range of Angles of Attack Zur Aerodynamischen Berechnung von Fluegelrumpf-Konfigurationen im Nicht-Linear en Anstellwinkel-Bereich.
D. Nikolitsch, and P. Hennig. 1980, 72p BMVG-FBWT-80-11
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

The prediction of normal force and pitching moment of cruciform wing-body configurations at subsonic speed, high angles of attack, and arbitrary roll position by means of coefficient synthesis is discussed. The aerodynamic coefficients of the exposed wing are determined, using the vortex lattice technique, assuming that the free vortices leave the wing panels inclined by half the angle of attack. The three dimensional base flow of wing-body configurations at subsonic speed was investigated theoretically. The dividing stream surface is assumed to be closed and axisymmetric and is simulated by source-sink distributions. The influence of the base flow on body and wing is verified for different wing positions, Mach numbers and angles of attack.

N82-13137/6 PC **A05**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Drehfluegler und Verkehr.
System Identification Helicopter Parameters. Determination from Flight Tests, Phase 2 Systemidentifizierung Drehfluegler Kennwertermittlung Aus Flugmessungen (Phase 2).
M. Kloster, and S. Attlfellner. 1980, 92p BMVG-FBWT-80-12
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

A parameter identification program for a hingeless rotor helicopter is considered. Flight conditions were selected with increasing instability, i.e., hover and level flight at maximum speed; with maximum weight and with a rearward center of gravity. A strap down system was chosen to provide the attitude feedback control necessary for proper identification. The control input signals were optimized for the unstabilized helicopter. Calculations in the time and frequency domains show that special distributions in the power spectrum of the input signals are needed for optimizing the closed loop system. The identified derivatives and the smoothened time histories from flight tests are compared with the identification results of linear and nonlinear simulations and of the quasistatic theory.

N82-13138/4 PC **A13**/MF **A01**
Vereinigte Flugtechnische Werke G.m.b.H., Bremen (Germany, F.R.).
Maneuver Load Control for the Reduction of Design Loads and Improvement of the Maneuverability of Modern Fighter Aircraft.
H. Balke. 1981, 283p BMVG-FBWT-81-2
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

Active control technology is applied and the feasibility of design load reduction is analyzed. The influence of direct force control on aircraft component loads and on aircraft maneuverability is seen. The deflection of secondary control surfaces in proportion with the commanded control surface was investigated in an open loop control system. Load reduction efficiency diagrams and tables are presented. A comparison of two different aircraft shows that with an open loop control system a considerable reduction in design load is possible. The loads acting on several aircraft components for different open loop control systems are compared. Several closed loop control systems with aircraft response feedback parameters were also investigated. The results are again presented as diagrams, and tables. Only in some cases does closed loop control achieve better results than open loop control. The best design load reduction is achieved with a combined open and closed loop control system. The investigation results are comprehensively evaluated and the parameters relevant for design load reduction are summarized.

N82-13457/8 PC **A05**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Structural Dynamics: Modified Calculations.
G. Hornung, and H. Roehrle. 1981, 83p BMVG-FBWT-81-1
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

Calculation methods which give natural and harmonically excited vibrations of modified structures, using the results of the original systems, are presented and tested. Most of the methods are based on a linear approximation, i.e., the individual terms of the equations of motion are subdivided into those of the original system and into corresponding difference terms whose products are subsequently neglected. Tests are carried out for simple models as well as for three-dimensionally idealized wing and aircraft structures. Concerning natural vibrations, it is difficult to estimate the achieved accuracy without knowing the exact results. The applied methods are Wielandt iteration and subspace iteration. Using the original natural modes as starting vectors leads to a considerable reduction in computation cost, even with severe modifications. Application of the linear approximation is shown for the reduction of the number of degrees of freedom, which precedes dynamic analysis.

PAT-APPL-6-297 459 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Semiautomatic Swaybrace.
Patent Application,
John C. Mick. Filed 28 Aug 81, 9p AD-D009 037/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A novel semiautomatic swaybrace is provided for steadying and restraining bombs or the like suspended from the bomb racks of aircraft. The swaybrace of this invention comprises a spiral wedge and torsion/compression spring uniquely configured to allow the swaybrace to be cocked to a retracted condition prior to loading of bomb rack and then to be released to automatically and firmly seat itself against the load. The interaction of the force stored in the compressed spring with the spiral wedge allow automatic extension of the swaybrace.

PATENT-4 302 745 Not available NTIS
Department of the Air Force, Washington, DC.
Aircraft Load Factor Overload Warning System.
Patent,
John T. Johnston, and George W. Venorsky. Filed 10 Jan 80, patented 24 Nov 81, 5p AD-D009 053/0, PAT-APPL-6-110 957
Supersedes PAT-APPL-6-110 957, AD-D006 963.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An overload warning system for fighter type aircraft combines analytical techniques of computing structural loads with flight conditions and aircraft control inputs to calculate the allowable load factor/control input on a real time basis. The flight conditions and aircraft control inputs are monitored by a microprocessor, which continuously monitors actual load factor, compares the answers with a computed allowable value and generates an ouput signal whenever a prescribed value is exceeded. This signal is available for transmission to aural or visual warning devices and for permanent recording. (Author)

PATENT-4 302 796 Not available NTIS
Department of the Air Force, Washington, DC.
Low Drag Integration of Laser Beam Pointing Device into Aircraft.
Patent,
Robert G. Gustavson, and Darold B. Cummings. Filed 27 May 76, patented 24 Nov 81, 8p AD-D009 051/4, PAT-APPL-688 460
Supersedes PAT-APPL-688 460-76, AD-D006 084.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent describes a laser beam pointing system, adapted for use in an aircraft. A preferred embodiment of the system includes: a laser beam source, within the aircraft, emitting a laser beam; and, a plurality of laser beam pointing devices in optical alignment with the laser beam. Each pointing device includes: a cylindrical shaped rotatable housing with a window, and either one or two rotatable optical means in optical alignment with the laser beam. This inventive system, unlike the prior art, permits the emitted laser beam to be projected over a broad range of angles with little or no aerodynamic interference with the aircraft on which it is mounted and used.

PB82-803420 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Surface Effect Vehicles and Surface Effect: General Studies. 1972-November, 1981 (Citations from the NTIS Data Base).
Jan 82, 193p
Supersedes PB80-814551, and NTIS/PS-79/0946.

The design of surface effect vehicles, their utilization, and their aerodynamic characteristics are investigated in these Government-sponsored research reports. Vehicles or ships in marine environments are not included. (This updated bibliography contains 186 citations, 6 of which are new entries to the previous edition.)

PB82-861469 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
STOL Aircraft. June, 1974-January, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-Jan 82.
Jan 82, 159p
Supersedes PB81-855579.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

The bibliography contains abstracts of reports relevant to short take off and land aircraft in terms of aerodynamic factors as well as propulsion systems. Emphasis is placed on the effects of turbulance, noise reduction, and material fatigue. Other topics include equipment for fuel conservation, and flight control. (This updated bibliography contains 145 citations, 41 of which are new entries to the previous edition.)

1D. Aircraft Flight Control and Instrumentation

AD-A108 223/9 PC **A14**/MF **A01**
Honeywell Systems and Research Center, Minneapolis, MN.
Integrated Control Design Techniques.
Final rept. Jun 79-Nov 80,
A. L. Jones, J. K. Mahesh, M. A. Kollodge, D. P. Pledger, and E. R. Rang. Aug 81, 314p 80SRC82, AFWAL-TR-81-3074
Contract F33615-79-C-3609

A total systems approach methodology and computer-aided design tool for integrated flight control design and evaluation has been formulated. This methodology is a composition of classical system design steps and system performance, reliability/survivability, packaging, and cost evaluation techniques assembled for interactive computer-based execution. The interactive sensor integration program developed under this methodology addresses the sensor requirements of the flight control, guidance and navigation, and weapon delivery functions as directed interactively by the designer and the mission, the system configuration, cost, power, weight, volume constraints, and total system performance. The demonstration program contains performance reliability, size, power, weight, cost data for gyros, accelerometers, radars, seekers, and air data systems in addition to analysis tools for evaluating navigation system accuracy, probability of target acquisition, and probability of kill for selected targets and weapons. (Author)

N82-13140/0 PC **A09**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Practical Aspects of Instrumentation System Installation, Volume 13.
R. W. Borek, A. Pool, and K. C. Sanderson. Sep 81, 197p NASA-TM-84067, AGARD-AG-160-V-13

A review of factors influencing installation of aircraft flight test instrumentation is presented. Requirements, including such factors as environment, reliability, maintainability, and system safety are discussed. The assessment of the mission profile is followed by an overview of electrical and mechanical installation factors with emphasis on shock/vibraion isolation systems and standardization of the electric wiring installation, two factors often overlooked by instrumentation engineers. A discussion of installation hardware reviews the performance capabilities of wiring, connectors, fuses and circuit breakers, and a guide to proper selections is provided. The discussion of the installation is primarily concerned with the electrical wire routing, shield terminations and grounding. Also inclued are some examples of installation mistakes that could affect system accuracy. System verification procedures and special considerations such as sneak circuits, pyrotechnics, aircraft antenna patterns, and lightning strikes are discussed.

1E. Air Facilities

AD-A108 149/6 PC **A04**/MF **A01**
Naval Air Engineering Center, Lakehurst, NJ. Ship Installations Engineering Dept.
Investigation of Crossdeck Pendant Catapult Slot Interaction; Proposed Corrective Measures for.
Final rept. Apr 78-Mar 79,
Alvin Hittner. 20 Nov 81, 56p Rept no. NAEC-91-7964

This report documents the investigation of the crossdeck pendant failure aboard USS JOHN F. KENNEDY (CV 67) in March 1978, which caused the loss of an F-14A. Included are the results of a survey to determine the scope of the deck pendant/catapult slot interaction problem, testing to confirm the failure sequence, and the evaluation of slot filler devices (buttons) to resolve the problem. (Author)

AD-A108 288/2 PC **A06**/MF **A01**
New Mexico Engineering Research Inst., Albuquerque.
Rapid Damage Assessment. Volume I. Methodology for Selecting Repair Area of Ordnance-Damaged Pavements.
Final rept. 1 Jun 77-31 Aug 79,
Christopher W. Wilson, and Neil D. Williams. Sep 80, 121p NMERI-AP-29-VOL-1, AFESC/ESL-TR-80-47-VOL-1
Contract F29601-76-C-0015

This report introduces and provides detailed information on four damage assessment and data reduction systems. The functions of these systems are to locate and assess the magnitude and location of the damage sustained by an airbase pavement during an attack using conventional weaponry and to select the section of the runway requiring the least amount of repair time to make operational. The primary system utilizes a linear photodiode array camera (1728 elements) to scan the runway and a microcomputer and video processing equipment to reduce the data and select the repair area. Three backup systems are recommended which require more time to assess the damage and reduce the data. Recommendations are made by the New Mexico Engineering Research Institute (NMERI) for the development of the four systems. This report is Volume I of two volumes. (Author)

AD-A108 514/1 PC **A03**/MF **A01**
Los Angeles Airport Improvement Working Group, Hawthorne, CA.
Task Force Delay Study, Los Angeles International Airport Improvement Program.
4 Dec 81, 26p

This report presents the results of a detailed analysis of the Los Angeles International Airport. The analysis was conducted by the Los Angeles Airport Improvement Working Group which had representatives from the airport sponsor, the Air Transport Association, the airlines serving Los Angeles, and the Federal Aviation Administration. The purpose of the analysis was to determine the causes of delay and the potential delay reduction benefits of recommended improvements. The effort was part of the Airport Improvement Program. (Author)

2. AGRICULTURE

2A. Agricultural Chemistry

PB82-145145 PC **A04**/MF **A01**
National Fertilizer Development Center, Muscle Shoals, AL.
Situation 81, TVA Fertilizer Conference Held at Louisville, Kentucky on October 7-8, 1981.
Dec 81, 74p TVA/OACD-82/5

This report is comprised of papers presented at the annual TVA sponsored fertilizer conference held in Louisville, Kentucky, October 7-8, 1981; and is primarily concerned with fertilizer research, development, and marketing.

2B. Agricultural Economics

PB82-140401 PC **A05**/MF **A01**
Clifford, ND.
Feasibility of Establishing a 100-Ton Per Day Sunflower Seed Crushing Plant at Clifford, North Dakota.
Oct 81, 95p EDA-81-0136
Grant ED-05-06-02022-40

Considerable interest is currently being shown in the concept of local processing of agricultural products. The production of sunflowers in North Dakota has shown tremendous growth over the past years. Cash receipts from sunflowers have made it the second most important cash crop in the state. It is felt that the plant can be justified as an energy producing facility. A sunflower crushing plant has to be feasible when competing as a producer of oil within traditional markets. The use of the oil as a source of energy is to be considered as an intangible benefit to the community, if sunflower oil is found to be an acceptable fuel.

PB82-143801 PC **A03**/MF **A01**
Nationale Raad voor Landbouwkundig Onderzoek TNO, The Hague (Netherlands).
Considerations in the Management of the Course of Agricultural Research (Te Hanteren Overwegingen Bij de Koersbepaling Van Het Landbouwkundig Onderzoek).
Series 1982-86.
1980, 34p
Text in Dutch.

The report deals with the development of agricultural research. It proposes giving attention to priorities and posteriorities for the years 1982-1986. The proposed expanded research deals with agricultural policy and also considers the problems of other elements of society to the extent that these are suitable for agricultural development considerations.

2C. Agricultural Engineering

ORNL/TM-7099 PC **A08**/MF **A01**
Cal Recovery Systems, Inc., Richmond, CA.
Input-Output Analysis of Various Elements of an Energy-Agro-Waste Complex.
Nov 79, 161p
Contract W-7405-ENG-26

The mass input and output streams of various agricultural and waste treatment processes were quantified and models developed to serve in the engineering analysis of potential waste heat utilization schemes. The unit process models can be integrated into energy-agro-waste complexes, in which waste heat from power plants is used by certain processes and the wastes of some processes are used as inputs to others. The models provide a means of determining the sizing or subsystems, the compatibility of subsystems, and the overall feasibility of an integrated complex. Ten potential complexes were qualitatively discussed and the considerations involved in forming such complexes explained. A mass balance analysis was performed on four integrated complexes demonstrating the engineering value of the analytical models developed. (ERA citation 05:005928)

PB82-143413 PC **A06**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Modernisation of Irrigation Systems Held at New Delhi on 2-4 April 1979. Volume I.
Mar 79, 106p PUB-133-VOL-1
See also Volume 2, PB82-143421.

The report contains 15 papers given for a symposia on 'Modernization of Irrigation Systems in India' held in New Delhi on 2-4 April 1979. Objectives of the irrigation project reports are to provide recommendations to upgrade irrigation canals and improve irrigation efficiency by proper design.

PB82-143421 PC **A03**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Modernisation of Irrigation Systems Held at New Delhi on 7-9 April 1979. Volume II: General Report and Discussions (Post Session).
Aug 80, 47p PUB-133-VOL-2
See also Volume 1, PB82-143413.

A symposium on 'Modernization of Irrigation Systems' was organized by the Central Board of Irrigation and Power during the 49th Board Meeting held in New Delhi from 7-9 April 1979. Sixteen papers were presented and discussed in two Sessions. They relate to one or several of the following principal objectives of rehabilitation of the existing projects: Improvement of reliability of irrigation supplies; increase in irrigation efficiencies and reduction of operation and maintenance costs; maintenance of productivity of land by drainage; prevention of failure of irrigation systems due to physical failure of key structures, like diversion weirs, canal structures, etc.

2E. Animal Husbandry

PB82-148362 PC **A10**/MF **A01**
Committee on Scholarly Communication with the People's Republic of China, Washington, DC.
Animal Agriculture in China,
Jacob A. Hoefer, and Patricia Jones Tsuchitani.
1980, 210p CSCPRC-11, ISBN-0-309-03092-7
Library of Congress catalog card no. 80-83376.

Partial contents:
- A brief introduction to China and its animal industry;
- Some notes on the characterization and distribution of domestic animals in China;
- Some economics of animal production;
- Swine production;
- Poultry production;
- Cattle and buffalo production;
- Sheep and goat production;
- The use of horses in China;
- Utilization of animal products;
- Reproductive performance of domestic animals and the science of reproductive physiology;
- Animal breeding and genetics;
- Nutrition research;
- Animal health.

PB82-861899 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Feline Leukemia. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for 1978-Jan 82.
Jan 82, 136p
Supersedes PB81-861064.

This bibliography contains citations concerning feline leukemia viruses and the variety of lymphoid and hemopoietic neoplastic and non-neoplastic diseases they cause in cats. The clinical and pathological manifestations of the diseases (particularly leukemia) are discussed, and assay systems (including ELISA and IFA) available to detect the presence of virus or antibodies are considered. The carrier state is discussed and vaccine development is noted. (This updated bibliography contains 124 citations, 23 of which are new entries to the previous edition.)

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

N82-14028/6 PC **A04**/MF **A01**
European Southern Observatory, Munich (Germany, F.R.).
Astronomical Activities Report.
Annual Report, 1980.
L. Woltjer. 1980, 62p ISSN-0531-4496

Research, using the Schmidt telescope and the sky survey and atlas laboratories, is outlined together with joint research with the Chilean institute. Telescopes, instrumentation, and image processing facilities are reviewed, including studies on the design of a computer controlled mirror support system for a very large (3.5m) telescope, and the testing and installation of the Coude Echelle Spectrometer. Tables show the programs and institutes using the 3.6m, 1.52m, and 1m telescopes, and the Danish 1.54m and Dutch 92cm telescopes.

3B. Astrophysics

AD-A108 151/2 PC **A03**/MF **A01**
Harvard Coll. Observatory, Cambridge, MA.
Speckle Image Reconstruction of Solar Features.
Final rept. 24 Feb 78-24 Feb 81,
R. W. Noyes, R. V. Stachnik, and P. Nisenson. 15 May 81, 46p AFGL-TR-81-0155
Contract F19628-78-C-0026

The hardware and software required to demonstrate and evaluate the speckle imaging process for use on solar features have been developed and tested. A video speckle camera has been designed, constructed, and successfully used to record data for a wide variety of astronomical objects, including solar features. The problems associated with recovering images from speckle data have been explored extensively. Particular attention has been given to identifying and correcting effects due to noise bias and edges in images reconstructed from real as well as simulated data. The principles involved in imaging solar features at improved resolution by means of speckle tech-

niques have been delineated, and sample images recovered from a variety of test data. (Author)

AD-A108 152/0 PC **A03**/MF **A01**
California Univ., San Diego, La Jolla. Dept. of Electrical Engineering and Computer Sciences.
The Three-Dimensional Structure of the Solar Wind from Radio Scintillations.
Final rept. 25 Feb 77-30 Sep 81,
B. V. Jackson, and A. Nagendran. Apr 81, 44p
AFGL-TR-81-0039
Contract F19628-77-C-0161

Since 1972 the UCSD 74 MHz radio observatory has continuously monitored the solar wind using the method of interplanetary scintillation (IPS). The two reports presented here bear on the problems involved in tracing the fast changing three dimensional structure of the solar wind from the solar surface out to the vicinity of the earth. The interplanetary scintillation technique is a radio propagation method for studying the velocity and small scale (approximately 100 to 1000 km) turbulence in the solar wind. The signals are cross-correlated from three spaced antennas to yield time offsets from which the speed of the scintillation pattern can be deduced. Comparisons of IPS observations with spacecraft measurements have shown excellent agreement when the IPS source lies in the ecliptic plane. Since our equipment relies on the use of natural radio sources, we are not restricted to observations in the ecliptic. Furthermore, observations can be made in the direction of many radio sources (almost) simultaneously so as to generate a three-dimensional map of the solar wind. The eight-year data base is important for correlative studies throughout the solar cycle. In our analysis we emphasize three time scales: (a) the solar cycle evolution of six month average velocity structures; (b) studies of one solar rotation duration; and (c) variations in the solar wind structure on time scales of a few days.

AD-A108 280/9 PC **A02**/MF **A01**
Stanford Univ., CA. Inst. for Plasma Research.
Temperature Minimum Heating in Solar Flares by Resistive Dissipation of Alfven Waves,
A. Gordon Emslie, and P. A. Sturrock. Aug 81, 23p
Rept no. SUIPR-856
Contract N00014-75-C-0673, Grant NGL-05-020-272

We examine the possibility that the strong heating produced at temperature-minimum levels during solar flares is due to resistive dissipation of Alfven waves generated by the primary energy release process in the corona. It is shown how, for suitable parameters, these waves can carry their energy essentially undamped into the temperature-minimum layers and can then produce a degress of heating consistent with observations. (Author)

N82-13593/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Magnetic Clouds Between 2-4 AU: Voyager Observations.
L. F. Burlaga, and K. W. Behannon. Oct 81, 26p
NASA-TM-83849
Submitted for Publication.

Magnetic clouds were observed in the solar wind between 2-4 AU. It was shown that they are stable enough to persist without major changes out to such distances. It is estimated that the clouds expand at a speed of the order of 45 km/s. The average Alfven speed at the front and rear boundaries is 104 km/s, the expansion speed is estimated to be nearly half of the Alfven speed, which is consistent with an earlier estimate of the expansion speed of clouds between the Sun and 1 AU. The magnetic field configuration is highly ordered and consistent with the passage of some kind of loop.

N82-13594/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Large-Scale Variations of the Interplanetary Magnetic Field: Voyager 1 and 2 Observations Between 1-5 au.
L. F. Burlaga, R. P. Lepping, K. W. Behannon, L. W. Klein, and F. M. Neubauer. Oct 81, 36p NASA-TM-83850
Submitted for Publication.

Observations by the Voyager 1 and 2 spacecraft of the interplanetary magnetic field between 1 and 5 AU were used to investigate the large scale structure of the IMF in a period of increasing solar activity. The Voyager spacecraft found notable deviations from the Parker axial model. These deviations are attributed both to temporal variations associated with increasing solar activity, and to the effects of fluctuations of the field in the radial direction. The amplitude of the latter fluctuations were found to be large relative to the magnitude of the radial field component itself beyond approximately 3 AU. Both Voyager 1 and Voyager 2 observed decreases with increasing heliocentric distance in the amplitude of transverse fluctuations in the averaged field strength (B) which are consistent with the presence of predominantly undamped Alfven waves in the solar wind, although and necessarily implying the presence of them. Fluctuations in the strength of B (relative to mean field strength) were found to be small in amplitude, with a RMS which is approximately one third of that for the transverse fluctuations and they are essentially independent of distance from the Sun.

N82-13876/9 PC **A07**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Infrared Experiments for Spaceborne Planetary Atmospheres Research. Full Report.
Nov 81, 150p NASA-TM-84414
Contract NAS7-100

The role of infrared sensing in atmospheric science is discussed and existing infrared measurement techniques are reviewed. Proposed techniques for measuring planetary atmospheres are criticized and recommended instrument developments for spaceborne investigations are summarized for the following phenomena: global and local radiative budget; radiative flux profiles; winds; temperature; pressure; transient and marginal atmospheres; planetary rotation and global atmospheric activity; abundances of stable constituents; vertical, lateral, and temporal distribution of abundances; composition of clouds and aerosols; radiative properties of clouds and aerosols; cloud microstructure; cloud macrostructure; and non-LTE phenomena.

N82-13877/7 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Infrared Experiments for Spaceborne Planetary Atmospheres Research. Executive Summary.
Nov 81, 13p NASA-TM-84413
Contract NAS7-100

The role of 0.5 to 300 micron remote sensing in planetary atmospheres exploration was evaluated by examining a broad range of measurement techniques including quantitative intercomparisons of existing and planned instruments by the phenomenological method. Key areas of infrared instrumentation requiring development for the investigations of atmospheres were identified.

N82-14027/8 PC **A02**/MF **A01**
California Univ., Los Angeles. Dept. of Astronomy.
Evolution of Close Binary Systems: Observational Aspects.
M. J. Plavec. Nov 81, 22p NASA-CR-165039, REPT-134
Sponsored by NASA and NSF. Presented at the Iau Colloq. No. 69, Binary and Multiple Stars as Tracers of Stellar Evolution, Bamberg, (Germany, F.R.). Sep 1981.

Detached close binary systems define the main sequence band satisfactorily, but very little is known about the masses of giants and supergiants. High dispersion international ultraviolet explorer satellite observations promise an improvement, since blue companions are now frequently found to late type supergiants. Mu Sagittarii and in particular Xi Aurigae are discussed in more detail. The barium star abundance anomaly appears to be due to mass transfer in interacting systems. The symbiotic stars are another type of binary systems containing late type giants; several possible models for the hotter star and for the type of interaction are discussed. The W Serpentis stars appear to be Algols in the rapid phase of mass transfer, but a possible link relating them to the symbiotics is also indicated. Evidence of hot circumstellar plasmas has now been found in several ordinary Algols; there may exist a smooth transition between very quiescent Algols and the W Serpentis stars. Beta Lyrae is discussed in the light of new spectrophotometric results.

N82-14037/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Planetary Radio Astronomy Observations from Voyager-2 Near Saturn.
J. W. Warwick, D. R. Evans, J. H. Romig, J. K. Alexander, and M. D. Desch. Nov 81, 22p NASA-TM-83856
Contract NAS7-100
Submitted for Publication Prepared in cooperation with Radiophysics, Inc., Boulder, CO. And Observatoire de Paris, Meudon, France.

Voyager-2 planetry radio astronomy measurements obtained near Saturn are discussed. They indicate that Saturnian kilometric radiation is emitted by a strong, dayside source at auroral latitudes in the northern hemisphere and by a weaker (by more than an order of magnitude) source at complementary latitudes in the southern hemisphere. These emissions are variable both due to Saturn's rotation and, on longer time scales, probably due to influences of the solar wind and the satellite Dione. The Saturn electrostatic discharge bursts first discovered by Voyager-1 and attributed to emissions from the B-ring were again observed with the same broadband spectral properties and a 10(h)11(m) + or - 5(m) episodic recurrence period but with an occurrence frequency of only of about 30 percent of that detected with Voyager-1. During the crossing of the ring plane at a distance of 2.88 R sub S, an intense noise event is interpreted to be consequence of the impact/vaporization/ionization of charged micron-size G-ring particles distributed over a total vertical thickness of about 1500 km.

N82-14038/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Saturnian Kilometric Radiation: Source Locations.
M. L. Kaiser, and M. D. Desch. Nov 81, 20p NASA-TM-83846
Submitted for Publication.

The surce locations of both polariation components of the saturn kilometer wavelength radiation were deduced using Voyager 1 and Voyager 2 planetary radio astronomy data and assumptions about radiation beam geometry. Radio source footprints were compared with the surface locations of saturns ultraviolet aurorae, its polar cap boundary, and its polar cusp.

N82-14040/1 PC **A18**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Catalog of Lunar Mare Basalts Greater Than 40 Grams. Part 1: Major and Trace Chemistry, with Megascopic Descriptions and Rock and Thin Section Photographs.
G. E. Lofgren, and E. M. Lofgren. Aug 81, 420p
NASA-TM-84065, LPI-CONTRIB-438

Megascopic descriptions of 133 basaltic rocks returned from the Moon are presented along with photographs of each rock and its thin section, if available. The major and trace element chemistry of each is included wherever possible.

N82-14041/9 PC **A25**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Reports of Planetary Geology Program, 1981.
H. E. Holt. Dec 81, 580p NASA-TM-84211

Abstracts of 205 reports from Principal investigators of NASA's Planetary Geology Program succinctly summarize work conducted and reflect the significant accomplishments. The entries are arranged under the following topics: (1) Saturnian satellites; (2) asteroids, comets and Galilean satellites; (3) cratering processes and landform development; (4) volcanic processes and landforms; (5) Aerolian processes and landforms; (6) fluvial, preglacial, and other processes of landform development; (7) Mars polar deposits, volatiles, and climate; (8) structure, tectonics, and stratigraphy; (9) remote sensing and regolith chemistry; (10) cartography and geologic mapping; and (11) special programs.

N82-14042/7 PC **A03**/MF **A01**
Nagoya Univ. (Japan).
A Triggering of Solar Flare by Magnetosonic Waves in a Neutral Sheet Plasma.
J. I. Sakai, and H. Washimi. Sep 81, 31p IPPJ-540

A theoretical model of the triggering of a solar flare by magnetosonic waves in a neutral sheet plasma is discussed. It is shown that the ponderomotive force due to the magnetosonic waves strongly excites the plasma convection flow in the magnetic neutral sheet which in turn enhances the tearing instability. The system of basic equations for the tearing mode including the time-averaged nonlinear effects due to the magnetosonic waves is derived and the boundary value problem is solved. The results show that the growth time of the instability is shortened to about 100 sec for reasonable magnetosonic wave intensity.

N82-14043/5 PC **A02**/MF **A01**
Hawaii Univ., Honolulu.
Submillimeter Observations of Solar Limb-Brightening in the Total Solar Eclipse of 31 July 1981.
Final Technical Report, 1 Oct. 1980 - 30 Sep. 1981.
E. E. Becklin, J. T. Jefferies, C. Lindsey, F. Orrall, and I. Gatley. 30 Sep 81, 3p
NASA-CR-165023, Contract NAG2-59

Eight flights of the Kuiper Airborne Observatory (KAO) were devoted to solar observation. The successful observation of a total solar eclipse was accomplished. The observations were made simultaneously at 30, 50, 100, and 200 microns. The successful adaptation of the KAO for solar observations thus provided the most detailed data to date in this spectral band. The results from a preliminary analysis of the KAO data are summarized: (1) the 200 micron limb is extended about 3 arc sec above the 30 micron limb, indicating the prescence of cool dense material up to the altitudes of spicules; (2) strong radial darkening of the quiet sun intensity profile appeared at 200 microns, probably an indication that hot material in the low chromosphere is recessed into vertical magnetic flux tubes embedded in a cooler nonmagnetic substrate, which obscures the heated material approaching the limb; (3) active regions were observed to undergo a strong increase in contrast above the quiet sun background at wave lengths of 100 microns and longer; and (4) the moon was mapped for use as a photometric standard for determining the absolute intensity of the sun in all four wavelength bands.

SLAC-Trans-192(Rev.) PC **A02**/MF **A01**
Akademiya Nauk SSSR, Moscow. Fizicheskii Inst.
Cosmological Models of the Universe with Rotation of Time's Arrow.
A. D. Sakharov. Jul 80, 12p
Contract AC03-76SF00515
D.

The paper treats cosmological models of the universe with rotation of time's arrow. The hypothesis of cosmological CPT symmetry previously advanced by the author and the hypothesis of a many-sheeted open model with negative space curvature, with possible violation of CPT symmetry by an invariant combined charge, are presented. The statistical paradox of reversibility is discussed with respect to these models. The fundamental possibility of estimating (in absolute magnitude) the serial number of the expansion-contraction cycle corresponding to the present stage of evolution of the universe is pointed out for the many-sheeted model with rotation of time's arrow. The small dimensionless quantity delta exp 2 / a exp 2 (where a is the hyperbolic radius and delta exp -3 the entropy density), which characterizes the average space curvature of the universe, is explained as a result of the evolution of the universe in the course of many successive expansion-contraction cycles. (ERA citation 05:032896)

3C. Celestial Mechanics

N82-14039/3 PC **A02**/MF **A01**
Smithsonian Astrophysical Observatory, Cambridge, MA.
Astrometric Observations of Comets and Asteroids and Subsequent Orbital Investigations.
Semiannual Progress Report, 1 May - 31 Oct. 1981.
R. E. Mccrosky, and B. G. Marsden. Nov 81, 14p
NASA-CR-165004, SAPR-16
Contract NGR-09-015-212

Comets and minor planets were observed with a 155 cm reflector. Their orbital positions are presented in tabular form.

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A108 143/9 PC **A03**/MF **A01**
Aerospace Corp., El Segundo, CA. Space Sciences Lab.
The Global Pc 5 Event of November 14-15, 1979.
Technical rept.,
J. F. Fennell, J. R. Asbridge, D. N. Baker, R. D. Belian, and P. R. Higbie. 1 Oct 81, 43p TR-0082(2940-05)-5, SD-TR-81-74
Contract F04701-81-C-0082

Large amplitude Pc-5 waves with 7-8 minute quasi-periodic variations were observed almost continuously for the forty-eight hours of November 14-15, 1979 by several spacecraft in or near geostationary orbit on the day-side portions of their orbits. The waves were observed as large modulations in both the electron and ion fluxes over a wide range of energies (approximately 1 to 500 keV) by the spacecraft 1976-059, 1977-007, 1979-053, P78-2, and GEOS-2 and as magnetic field peak-to-peak modulations of 15-25 gamma by the P78-2 and GOES-2 and -3 magnetometers. The remarkably long persistence of these waves contrasts substantially with observations of typical flux modulation events which usually last less than one hour and which typically show little modulation of the greater or less than 150 keV proton fluxes.

AD-A108 185/0 PC **A03**/MF **A01**
Clark Univ., Worcester, MA.
Electron Transport at High Altitude.
Final rept. Nov 78-Jun 80,
Madhoo Kanal, and Ahmad Farokh Torabi. 30 Sep 80, 44p AFGL-TR-80-0314
Contract F19628-79-C-0008

An infinite medium Green's function is constructed for the boundary value problem of electron transport along the magnetic field lines of the earth in an inhomogeneous anisotropically scattering medium. The goal of calculation is to obtain the photoelectron energy flux as a function of altitude, energy and the invariant latitude. The problem involves obtaining the solution for a Boltzmann type equation using a combination of analytic and numerical techniques. Detailed transport calculations of photoelectron energy degradation processes via both inelastic collisions with neutral and interaction with the ambient plasma are performed. A comparison is made of fluxes obtained with transport neglected (local fluxes) with those obtained with transport included (transport fluxes). The local fluxes are found to be larger than transport fluxes at low altitudes, while at high altitudes the transport fluxes are larger than local fluxes. As an illustrated calculation of our results of photoelectron fluxes, we present the volume excitation rates of several lines and bands of the day airglow. We also compare our results of excitation rates with theoretical and experimental data obtained in the existing literature. (Author)

AD-A108 218/9 PC **A02**/MF **A01**
Emmanuel Coll., Boston, MA.
Equatorial Scintillations - A Review.
Scientific rept. no. 1, 14 Nov 80-13 Nov 81,
Santimay Basu, and Sunanda Basu. 1981, 19p AFGL-TR-81-0332
Contracts F19628-81-K-0011, F19628-78-C-0005
Pub. in Jnl. of Atmospheric and Terrestrial Physics, v43 n5/6 p473-489 1981. Sponsored in part by Grant NSG-5419.

No abstract available.

AD-A108 411/0 PC **A02**/MF **A01**
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
Auroral Kilometric Radiation: A Theoretical Review.
Progress rept.,
Crockett L. Grabbe. 9 Jul 80, 9p
Contract N00014-76-C-0016, Grant NGL-16-001-043
Pub. in Reviews of Geophysics and Space Physics, v19 n4 p627-633 Nov 81.

No abstract available.

AD-A108 577/8 PC **A04**/MF **A01**
Pacific-Sierra Research Corp., Santa Monica, CA.
Calculation of Ionospheric Conductivity Profiles by Inverting VLF/LF Reflection Data: I. Isotropic Propagation.
Final technical rept. Oct 79-May 81,
R. E. Warren, E. C. Field, and C. R. Warber. Oct 81, 53p PSR-1114, RADC-TR-81-286
Contract F19628-78-C-0088

This report presents an iterative method for inverting VLF/LF ionosounding data to obtain ionospheric conductivity profiles. The relationship between the detail that can be realized in the calculated profile and the quality and quantity of the reflection data is given explicitly. Only altitudes below about 70 km where the propagation can be assumed isotropic are considered, although the method can be extended to anisotropic propagation. The method is demonstrated by applying it to two qualitatively different ionospheric models--a strong SPE disturbance and a C-layer exhibiting a well-defined conductivity peak. Ground-level reflection data contain information only about those heights from which significant energy is returned. The calculated profiles agree well with the true profiles over the height range where the strongest reflections occur, and break down outside of that range. The solutions converge toward the true profiles despite the use of initial estimates that contain no information about the true ionospheric structure. The height resolution actually achieved for the two examples is much better than the theoretically predicted limit. (Author)

AD-A108 680/0 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
A 'Worst Case' Spacecraft Environment as Observed by SCATHA on 24 April 1979.
Environmental research papers,
E. G. Mullen, M. S. Gussenhoven, and H. B. Garrett. 31 Jul 81, 38p Rept nos. AFGL-TR-81-0231, AFGL-ERP-751

A survey of data from the first year of the P78-2 SCATHA satellite operations showed that a highest level spacecraft frame charging (phi sub f) both in sunlight (-340 V) and in eclipse (> -8 kV) occurred on 24 April 1979. Analysis of the data indicates that if the sunlight charging environment had been present during eclipse, the vehicle would have charged in excess of 15 kV which is above any known charging level observed to date for the SCATHA satellite. Therefore, the environment at the peak of the sunlight charging at approx. 0650 UT 24 April 1979 was chosen for this worst case study. The environment at this time is characterized by an injection of high energy (30-335 keV) electron fluxes whose combined current correlates with phi sub f with a correlation coefficient of 0.95. The fluxes were highly anisotropic, maximizing perpendicular to the magnetic field. The low energy (< 4 keV) electron population had a density < 1/cc and the low energy ions were near background. The measured electron distribution functions, when fit to double Maxwellians by a least squares technique, show that throughout the sunlight charging the high and low temperatures remained nearly the same, while the density of the high energy component followed the charging levels. The injection occurred simultaneously with the rapid return of the magnetospheric magnetic field to a more dipole-like configuration.

N82-13590/6 PC **A03**/MF **A01**
Finnish Meteorological Inst., Helsinki.
Magnetic Results from Nurmijaervi Geophysical Observatory 1980, No. 22.
1981, 34p ISBN-951-697-155-5, ISSN-0071-5212

Magnetic disturbance measurements are presented in tabular form. Variometers and proton magnetometers are used.

N82-13591/4 PC **A03**/MF **A01**
Finnish Meteorological Inst., Helsinki.

Three-Dimensional Mapping of the Aurora from Digitized All-Sky Pictures.
K. U. Kaila. Apr 81, 42p REPT-550.388.8, TR-25

A mathematical method of calculating the altitudes and geographical positions of discrete auroral forms is presented. It is based on pairs of simultaneous all-sky frames taken at two stations and requires knowledge of the positions, orientation errors and scale functions of the all-sky cameras. The corresponding points of the aurora need not be known. After the corrections, any point in the sky can be determined with an accuracy of about 0.2 deg. The accuracy that can be reached is of the order of 1 km in altitude and 2 km in position.

N82-13592/2 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
SAM 2 Measurements of the Polar Stratospheric Aerosol, Volume 1: October to April 1979.
M. P. Mccormick. Dec 81, 78p NASA-RP-1081

Weekly averages of Antarctic and Arctic stratospheric aerosol data as well as corresponding temperature profiles for the time and place of each stratospheric aerosol measurement (SAM) II measurement during the first 6 months of satellite flight are presented. From the aerosol extinction profile data, contours of aerosol extinction as a function of altitude and longitude or time are plotted. Aerosol optical depths are calculated for each week. Polar stratospheric clouds at altitudes of about 22 km were observed during the Arctic winter at various times and locations. A representative sample of the first 6 months of data to be used in atmospheric and climatic studies is outlined.

N82-13605/2 PC **A05**/MF **A01**
Bonn Univ. (Germany, F.R.). Inst. fuer Astrophysik and Extraterrestische Forschung.
Temperature and Density of Geocoronal Helium Derived from a Rocket-Borne He Resonance Cell Experiment.
Final Report.
P. B. Seidl. Dec 80, 99p BMFT-FB-W-80-015, ISSN-0170-1339
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The helium resonance radiation intensity of 58.4 nm was observed with a helium resonance cell photometer aboard a Black Brant 4b rocket during a daytime flight up to a height of 720 km. The height dependence of the optically thin part of resonance emission permits the deduction of the geocoronal helium temperature and density. A procedure is explained which allows the optically thin from the optically thick contribution to be distinguished and analyzes them separately. At 700 km the temperature found attains 1130 K and the density 1.35 X 10 to the 5/cucm. Whereas the temperature obtained is in reascnable agreement with current model values, the density is considerably lower than theoretically predicted.

N82-13620/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Comparison of Data Inversion Techniques for Remotely Sensed Wide-Angle Observations of Earth Emitted Radiation.
R. N. Green. Dec 81, 46p NASA-TP-1924, L-14591

The shape factor, parameter estimation, and deconvolution data analysis techniques were applied to the same set of Earth emitted radiation measurements to determine the effects of different techniques on the estimated radiation field. All three techniques are defined and their assumptions, advantages, and disadvantages are discussed. Their results are compared globally, zonally, regionally, and on a spatial spectrum basis. The standard deviations of the regional differences in the derived radiant exitance varied from 7.4 W-m/2 to 13.5 W-m/2.

N82-13622/7 PC **A04**/MF **A01**
Systems Applications, Inc., San Rafael, CA.
Development of an Infrared Radiative Heating Model.
Final Report.
R. W. Bergstrom, and L. C. Helmle. Apr 79, 53p NASA-CR-166272, SAI-EF79-56
Contract NAS2-10019

Infrared radiative transfer solution algorithms used in global circulation models were assessed. Computation techniques applicable to the Ames circulation model are identified. Transmission properties of gaseous CO2, H2O, and O3 are gathered, and a computer program is developed, using the line parameter tape and Voight profile subroutine, which computes the transmission of CO2, H2O, and O3. A computer code designed to compute atmospheric cooling rates was developed.

PATENT-4 282 525 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Microwave Limb Sounder.
Patent,
J. J. Gustincic. Filed 24 Sep 79, patented 4 Aug 81, 9p N82-12685/5, PAT-APPL-6-078 612
Supersedes PAT-APPL-6-078 612, N79-34014 (17 - 24, p 3285).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Trace gases in the upper atmosphere can be measured by comparing spectral noise content of limb soundings with the spectral noise content of cold space. An offset Cassegrain antenna system and tiltable input mirror alternately look out at the limb and up at cold space at an elevation angle of about 22. The mirror can also be tilted to look at a black body calibration target. Reflection from the mirror is directed into a radiometer whose head functions as a diplexer to combine the input radiation and a local ocillator (klystron) beam. The radiometer head is comprised of a Fabry-Perot resonator consisting of two Fabry-Perot cavities spaced a number of half wavelengths apart. Incoming radiation received on one side is reflected and rotated 90 deg in polarization by the resonator so that it will be reflected by an input grid into a mixer, while the klystron beam received on the other side is also reflected and rotated 90 deg, but not without passing some energy to be reflected by the input grid into the mixer.

PB82-143132 PC **A04**/MF **A01**
Indian Space Research Organization, Bangalore.
Total Ionospheric Absorption at the Magnetic Equator,
K. Parameswaran. Jul 78, 54p ISRO-VSSC-SR-07-78

The results of a study of equatorial ionospheric absorption of radio waves employing riometer technique are presented in this report. A brief introduction of the subject and a survey of existing literatures are also given. The experimental setup used has been described. The influence of solar geophysical parameters on ionospheric absorption has been investigated using the data for the period June 1970 to September 1972. A theoretical study of the variation of F-region absorption with different F-region parameters has been made, and the observed variations are explained in the light of these theoretical estimates.

PB82-860248 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Atmospheric Aerosols: Mathematical Modeling and Computerized Simulation. 1972-January, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Jan 82.
Jan 82, 318p
Supersedes PB81-854440.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography covers mathematical modeling and computerized simulation of atmospheric aerosols of various compositions from a wide variety of sources. The optical, chemical, and physical properties and the effects of aerosols are modeled and physical interpretations rendered. Some attention is given to extraterrestrial planetary aerosols. (This updated bibliography contains 330 citations, 232 of which are new entries to the previous edition.)

4B. Meteorology

AD-A108 155/3 PC **A13**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume I. New England Region.
Final rept.
Jun 81, 287p
Contract DOT-FA79WAI-057
See also Volume 2, Part A, AD-A108 156 and Volume 2, Part B, AD-A108 157.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 156/1 PC **A19**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume II. Part A. Eastern Region.
Final rept.
Jun 81, 436p
Contract DOT-FA79WAI-057
See also Volume 2, Part B, AD-A108 157.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 157/9 PC **A18**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume II. Part B. Eastern Region.
Final rept.
Jun 81, 421p
Contract DOT-FA79WAI-057
See also Volume 3, Part A, AD-A108 158.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 158/7 PC **A22**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume III. Part A. Southern Region.
Final rept.
Jun 81, 505p
Contract DOT-FA79WAI-057
See also Volume 3, Part B, AD-A108 159.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 159/5 PC **A20**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume III. Part B. Southern Region.
Final rept.
Jun 81, 456p
Contract DOT-FA79WAI-057
See also Volume 4, Part A, AD-A108 160.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 160/3 PC **A24**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume IV. Part A. Great Lakes Region.
Final rept.
Jun 81, 560p
Contract DOT-FA79WAI-057
See also Volume 4, Part B, AD-A108 161.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 161/1 PC **A19**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume IV. Part B. Great Lakes Region.
Final rept.
Jun 81, 429p
Contract DOT-FA79WAI-057
See also Volume 5, Part A, AD-A108 162.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids.

AD-A108 162/9 PC **A14**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume V. Part A. Central Region.
Final rept.
Jun 81, 316p
Contract DOT-FA79WAI-057
See also Volume 5, Part B, AD-A108 163.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 163/7 PC **A12**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume V. Part B. Central Region.
Final rept.
Jun 81, 258p
Contract DOT-FA79WAI-057
See also Volume 6, Part A, AD-A108 164.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids.

AD-A108 164/5 PC **A18**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume VI. Part A. Southwest Region.
Final rept.
Jun 81, 416p
Contract DOT-FA79WAI-057
See also Volume 6, Part B, AD-A108 165.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids.

AD-A108 165/2 PC **A22**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume VI. Part B. Southwest Region.
Final rept.
Jun 81, 521p
Contract DOT-FA79WAI-057
See also Volume 7, Part A, AD-A108 166.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids.

AD-A108 166/0 PC **A17**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume VII. Part A. Rocky Mountain Region.
Final rept.
Jun 81, 387p
Contract DOT-FA79WAI-057
See also Volume 7, Part B, AD-A108 167.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 167/8 PC **A20**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume VII. Part B. Rocky Mountain Region.
Final rept.
Jun 81, 451p
Contract DOT-FA79WAI-057
See also Volume 8, AD-A108 168.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids.

AD-A108 168/6 PC **A19**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume VIII. Northwest Region.
Final rept.
Jun 81, 432p
Contract DOT-FA79WAI-057
See also Volume 9, Part A, AD-A108 169.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 169/4 PC **A17**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume IX. Part A. Western Region.
Final rept.
Jun 81, 386p
Contract DOT-FA79WAI-057
See also Volume 10, Part A, AD-A108 171.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 170/2 PC **A16**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume IX. Part B. Western Region.
Final rept.
Jun 81, 365p
Contract DOT-FA79WAI-057
See also Volume 9, Part A, AD-A108 169 and Volume 10, Part A, AD-A108 171.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids. (Author)

AD-A108 171/0 PC **A15**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume X. Part A. Alaskan and Pacific Regions.
Final rept.
Jun 81, 350p
Contract DOT-FA79WAI-057
See also Volume 10, Part B, AD-A108 172.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids.

AD-A108 172/8 PC **A15**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume X. Part B. Alaskan and Pacific Regions.
Final rept.
Jun 81, 339p
Contract DOT-FA79WAI-057
See also Volume 10, Part A, AD-A108 171 and Volume 11, AD-A108 177.

This report provides summary tables and graphic wind roses depicting wind direction and speed under specific ceiling - visibility conditions at 283 airports. This data will be used in the application of FAA's establishment criteria for precision and non-precision approach and landing aids.

AD-A108 177/7 PC **A11**/MF **A01**
National Climatic Center, Asheville, NC.
Wind - Ceiling - Visibility Data at Selected Airports. Volume XI. Visibility Time Series for Key Stations.
Final rept.
Jun 81, 238p
Contract DOT-FA79WAI-057
See also Volume 1, AD-A108 155.

Data presented in Volume I-X are based on 3-hourly observations. 51 key stations were selected for comparison of hourly observations versus 3-hourly observations. Statistical variations were noted in 18 cases for which detailed comparisons are presented. (Author)

AD-A108 207/2 PC **A22**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Low Level Wind Study, Bald Hills - Thunderstorm Season, 1976-77,
C. K. Rider, D. J. Sherman, and M. R. Thomson. Oct 80, 511p Rept no. ARL/STRUC-384

Contents: Experimental Apparatus and Procedure; Incidence of Thunderstorms; Long Term Wind Speed Statistics; Statistics of Wind Shears; Choice of Incidents; Wind Speed Profiles; Effect of Height, Peak Value Statistics, and Averaging Time; Duration of Shear Bursts; Wind Shear Monitoring as a Landing Aid; and Horizontal Structure of the Wind.

AD-A108 222/1 MF **A01**
Naval Air Systems Command, Washington, DC.
U.S. Navy Marine Climatic Atlas of the World. Volume IX. World-Wide Means and Standard Deviations.
Reference rept.
Oct 81, 355p Rept no. NAVAIR-50-1C-65-VOL-9
See also Volume 5, AD-A089 035.
Availability: Superintendent of Documents, GPO, Washington, DC 20402 Stock no. 008-042-00072-1 HC $31.00. Microfiche furnished to DTIC and (NTIS) users.

The eight volume series of the U.S. Navy Marine Climatic Atlas of the World has had world-wide acceptance as an authoritative reference for large scale operational planning and applied research. This volume, based on the entire period of record available, resulted from the need to develop an automated quality control scheme for marine observations for use in the revision of the first 5 volumes of Atlas series. This was basically achieved by summarizing, analyzing and digitizing the mean and standard deviation charts that appear in this volume. (Author)

AD-A108 253/6 PC **A15**/MF **A01**
Raytheon Co./Autometric, Wayland, MA. Equipment Div.
R&D Equipment Information Report. Fault Tolerant Weather Radar Processor.
Final rept. 1 Jun 78-16 Oct 80,
Michael J. Young, and Anthony J. Jagodnik, Jr. Mar 81, 348p ER81-4053, AFGL-TR-81-0086
Contract F19628-78-C-0113

A programmable signal processor which achieves fault tolerance and modularity through distribution of tasks among a number of identical programmable Common Elements including spares, is described. This processor's design and usage in a meteorological Doppler radar signal processing application is discussed at several levels of detail covering hardware firmware, operating system software, user software, and development aids. (Author)

AD-A108 372/4 PC **A02**/MF **A01**
Drexel Univ., Philadelphia, PA. Dept. of Physics and Atmospheric Sciences.
Experiments in Regional Scale Numerical Weather Prediction Including Use of SESAME '79 Data.
Final rept.,
Carl W. Kreitzberg. Aug 81, 10p AFOSR-TR-81-0770
Contract F49620-79-C-0208

This research has as a goal testing of a state-of-the-art mesoscale model using a unique set of meteorological data and to gain insight into the modeling of radiation, clouds, precipitation and boundary layer effects in

such models. Development of four-dimensional data assimilation schemes and analysis of the sensitivity of the model to horizontal and vertical resolution were also to be accomplished. The four-dimensional assimilation was deemphasized, at this time, when it became clear that the sensitivity results differed greatly from storm to storm. Scientific papers have been prepared that demonstrate the usefulness and sensitivity of such models in studying the evolution of meso-alpha (regional or sub-synoptic) and meso-beta (fronts; convection bands) disturbances. Specifically, it is clear that latent heating from convection can greatly alter the wind field on scales of 1,000 km. The first SESAME '79 case, April 10, 11, 1979 that produced the Wichita Falls, TX tornado was unique in that the cyclonic scale could not be predicted from the conventional data. The substantial variation in predictability suggests that considerable emphasis should, in the future, be placed on four-dimensional data assimilation. (Author)

AD-A108 678/4 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Short-Range Forecasting of Cloudiness and Precipitation through Extrapolation of GOES Imagery.
Environmental research papers,
H. Stuart Muench. 16 Jul 81, 48p Rept nos. AFGL-TR-81-0218, AFGL-ERP-750

This report describes the development and testing of an objective technique to forecast cloudiness and precipitation through extrapolation of satellite imagery. By using an objectively determined cloud-motion vector, the technique makes local forecasts of satellite parameters (brightness and IR temperature), with high temporal resolution, using simple linear extrapolation. Algorithms are then used to convert the satellite parameters to total cloud cover, probability of 1-hour precipitation, and presence of low, middle, and high clouds. The test program computed motion vectors and made forecasts out to 7 hours, in half-hour steps, at 30 locations. The program was tested on 12 spring and fall cases, using half-hourly GOES imagery. For periods beyond 2 hours, forecasts of cloud cover and precipitation were markedly better than persistence, while deficiencies in specification hindered short-period performance. Forecasts of cloud layers were worse than persistence due to inadequate specification algorithms. The net results were quite encouraging.

AD-A108 679/2 PC **A04**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Radar Detection of Turbulence in Thunderstorms.
Environmental research papers,
Alan R. Bohne. 31 Mar 81, 64p Rept nos. AFGL-TR-81-0102, AFGL-ERP-736

Theoretical investigations are undertaken to relate intensity of turbulent air motion to Doppler radar spectrum mean and variance in precipitation environments. Examples of theoretical radar derived turbulence power density spectra and total precipitation motion variance show that effects due to imperfect particle response are significant for turbulence scale lengths less than 250 m. Doppler spectrum variance and estimated eddy dissipation rate (epsilon) are found strongly dependent upon precipitation environment for ranges less than about 20 km, and for cases where the turbulence outer scale length (lambda) is less than 0.5 km. They are also found to be essentially independent of lambda when the maximum pulse volume dimension is less than 1/2 lambda, and independent of range but strongly dependent on lambda at ranges where the maximum pulse volume dimension is greater than lambda. Estimation of epsilon by radar is shown to be unreliable until a method of remotely determining lambda is found. Nevertheless, classification of turbulence severity (index = cube root of epsilon is possible with only a reasonable guess of lambda. Analyses of aircraft/gust velocity data indicate that thunderstorm turbulence is localized into discrete patches, and that such localization must be accounted for when aircraft gust velocity data undergo power spectrum analysis.

AD-A108 681/8 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
An Automated Low Cloud Prediction System.
Environmental research papers,
Edward B. Gaisler. 7 Jul 81, 38p Rept nos. AFGL-TR-81-0191, AFGL-ERP-746

At the Air Force Geophysics Laboratory (AFGL) Weather Test Facility (WTF) at Otis AFB, MA, a network of cloud base height, visibility, and wind measuring instruments were used to explore techniques for the short range prediction of low cloud ceiling. AFGL developed this system in response to the USAF Air Weather Service's requirements to modernize its basic weather support capabilities. This system allowed AFGL to evaluate the ability of statistical forecasting techniques to provide decision assistance significantly improved over the decision assistance currently provided by climatology and persistence. The approach relies upon the use of a hierarchical clustering algorithm to transform the raw cloud base height data into an automated low cloud observation. Four prediction techniques (Regression Estimation of Event Probabilities, Equivalent Markov, climatology, and persistence) yielding probability estimates of low cloud ceiling were evaluated and comparisons made to determine their respective accuracy and reliability. In addition, thresholding techniques were used to convert probability forecasts (unit bias, maximum probability, iterative, and persistence). Analysis of the data collected at the AFGL WTF demonstrates the accuracy and reliability of the automated low cloud prediction system. Regression estimation of event probabilities provided accurate, reliable, high resolution probability forecasts with results superior to climatology, persistence, and Equivalent Markov.

AD-A108 754/3 PC **A04**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA.
ADS Report Number 5.
Rept. for Jun-Nov 78,
S. Pazan, and J. Bytof. Dec 81, 60p Rept no. SIO-REF-81-39
Contract N00014-80-C-0440

Since 1976, four reports on oceanographic and meteorological conditions in the North Pacific have been produced by the NORPAX Data Program covering the period from June, 1976 through May, 1978. This is the fifth in the series, and covers the period from June, 1978 through November, 1978. This issue contains: contour maps of monthly meaned Fleet Numerical Oceanographic Central (FNOC) air temperature, sea temperature, wind speed, wind direction, surface vapor pressure, and 700 mb height; NORPAX Data Management calculated wind stress, wind stress curl, wind shear velocity cubed, sensible heat flux, latent heat flux; objectively analyzed TRANSPAC (Trans Pacific) temperatures at discrete depths.

AD-A108 756/8 PC **A02**/MF **A01**
Science Applications, Inc., Monterey, CA.
Atlantic Hurricane Wind Probability Forecasting (WINDPA).
Final rept.,
Jerry D. Jarrell. Oct 81, 23p NEPRF-CR-81-05
Contract N00228-80-C-GA08

The Atlantic Hurricane Wind Probability (WINDPA) program is documented. WINDPA provides the probability of selected Navy and Air Force bases either being struck by an Atlantic Ocean tropical cyclone or receiving winds of at least 30 or 50 kt. The basis for WINDPA estimates is discussed in comparison to a similar western Pacific program (WINDP). WINDPA estimates were subjected to independent reliability testing, the results of which are discussed.

N82-13623/5 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Compensation for Use of Monthly-Averaged Winds in Numerical Modeling.
C. L. Parkinson. Nov 81, 95p NASA-TM-83855

Ratios R of the monthly averaged wind speeds to the magnitudes of the monthly averaged wind vectors are presented over a 41 x 41 grid covering the southern Ocean and the Antarctic continent. The ratio is found to vary from 1 to over 1000, with an average value of 1.86. These ratios R are relevant for converting from sensible and latent heats calculated with mean monthly data to those calculated with 12 hourly data. The corresponding ratios alpha for wind stress, along with the angle deviations involved, are also presented over the same 41 x 41 grid. The values of alpha generally exceed those for R and average 2.66. Regions in zones of variable wind directions have larger R and alpha ratios, over the ice-covered portions of the southern Ocean averaging 2.74 and 4.35 for R and alpha respectively. Thus adjustments to compensate for the use of mean monthly wind velocities should be stronger for wind stress than for turbulent heats and stronger over ice covered regions than over regions with more persistent wind directions, e.g., those in the belt of mid-latitude westerlies.

PB82-145624 PC **A03**/MF **A01**
Indian Inst. of Tropical Meteorology, Poona.
Some Aspects of Oceanic ITCZ and its Disturbances During the Onset and Established Phase of Summer Monsoon Studied with Monex-79 Data,
D. R. Dikka, D. K. Paul, and S. V. Singh. Mar 81, 29p R-032

Aerological data collected by conventional and special observational platforms during the field phase of Summer Monex-79 are analysed in the report. The characteristic features of the near equatorial oceanic ITCZ during the pre-onset/onset, as well as the established phase of the monsoon and its superimposed disturbances are documented based on the analysis of data at 700 mb. The onset phase ITCZ is characterized by a narrow shear zone having maximum cyclonic vorticity, convergence, colder temperature, high moisture content and is also the region of convective weather.

PB82-147448 PC **A05**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
State of Maryland Bainbridge Meteorological Station - Processing and Archiving of Data,
Vanda T. Freeman, and Edward A. Davis. Jul 81, 87p PPSP/JHU/PPSE-9-1

The John Hopkins University Applied Physics Laboratory instrumented and operated a meteorological station at the Bainbridge Naval Training Center, Bainbridge, Maryland, from December 1977 through July 1979. The purpose of the station was to develop a meteorological data base to be used by the State of Maryland Power Plant Siting Program in assessing the environmental impacts of operating a power plant at the site. This report describes the processing and archiving of the data collected from the three levels of the 180 foot tower.

5.
BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A108 272/6 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
The Army Should Improve Its Requirements Determination System.
1 Dec 81, 24p Rept no. GAO/PLRD-82-19
Report to the Secretary of the Army.

The Army Missile Command is the central buyer and supplier of missile equipment and components. The Command manages 56,300 items with an inventory value of about $436.1 million. In fiscal year 1981, the Command planned to buy about $274 million of stock items. GAO made this review to evaluate the Army's requirements determination system and to determine whether the requirements were based on valid data and needs. In view of the Reagan Administration's plan to increase Defense spending and the expectation that the services will receive full funding in fiscal year 1982, it is imperative that such funds be applied where they are most needed. Some of the information contained in this report is also contained in a separate GAO report to the Secretary of Defense, which contrasts and compares the services' requirements determination processes.

AD-A108 303/9 PC **A10**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.

A Multistage R & D Project Selection Model with Multiple Objectives.
Doctoral thesis,
Thomas Craig Harrington. 1979, 207p Rept no. AFIT-CI-79-309D

This dissertation presents a multiple objective, zero-one mathematical programming model for the stochastic, multistage R&D project selection and resource allocation problem. The model is intended for those research and development activities which have a certain degree of autonomy in the selection of their research portfolio and which concentrate efforts in applied research or development projects. Each feature of the proposed model is designed to incorporate realistic aspects of the R&D decision making process. First, the model includes an integer goal programming formulation which enables the formal incorporation of multiple, noncommensurate objectives along with integer treatment of possible projects. Second, decision tree planning techniques are used to represent the sequential aspects of allocating scarce resources over the planning horizon, to reflect various project and goal relationships, and to incorporate probabilistic future events and outcomes. Third, simulation techniques are used to convert the probabilistic parameters into deterministic inputs for the mathematical formulation. Finally, the model includes a heuristic based solution algorithm involving system constraint partitioning procedures, and iterative one-pass variable selection and solution variable exchange routines to enable the efficient solution of realistic size problems.

AD-A108 340/1 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
The Services Should Improve Their Processes for Determining Requirements for Supplies and Spare Parts.
30 Nov 81, 53p Rept no. GAO/PLRD-82-12
Report to the Secretary of Defense.

This report contains recommendations to the Secretary of Defense for improving the services' requirements determination processes for secondary reparable and expendable items. GAO found numerous inconsistencies in the ways the services approach the process of determining requirements. Furthermore, the data used in the requirements computations often require extensive adjustments before they can be used. These inconsistencies and inaccurate data can result in invalid requirements and procurement actions. GAO believes that through better supervision and training of personnel responsible for systems operations and more consistent requirements determination methods, the services can make more prudent decisions concerning the use of limited resources and thereby enhance equipment availability and avoid investments in stock levels beyond real needs. (Author)

AD-A108 393/0 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Program Analysis Div.
Better Accountability Procedures Needed in NSF and NIH Research Grant Systems.
30 Sep 81, 97p Rept no. GAO/PAD-81-29
Report to the Congress.

The National Science Foundation (NSF) and the National Institutes of Health (NIH) awarded $2.2 billion in fiscal year 1980 for the support of basic research at colleges and universities. Peer review (expert advice of selected researchers) is the primary component of the research grant scientific performance accountability systems used for selecting research proposals to be funded. GAO studied a random sample of NSF and NIH basic research grants, and found that the peer review and internal review systems are working reasonably well. Although the systems are basically the same at the two agencies, the procedures differ. GAO found that some of the NIH peer review procedures have advantages over those at NSF, but believes that changes are needed by both agencies to improve their scientific performance accountability systems. (Author)

AD-A108 425/0 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
The Department of Energy's Use of Support Service Contractors to Perform Basic Management Functions.
14 Sep 81, 20p Rept no. GAO/EMD-81-144

During this review we were able to identify several conditions which give DOE contractors sufficient latitude to perform basic management functions. Specifically, we found that: While OMB guidance to Federal agencies prohibits contractors from performing governmental management functions, contractors are permitted to assist the agency in performing such functions. No criteria exists to determine what constitutes performance versus assistance by contractors. DOE officials have stated that there are not enough people available within the agency to perform all the required work. While contractors are hired to assist DOE in performing program functions, they may actually perform the work as extensions to the agency staff, thus giving the appearance of circumventing personnel ceilings. DOE contract statements of work are often written to allow for considerable flexibility in the actual work performed. This gives contractors an opportunity to perform basic management functions. We found it extremely difficult to determine when contractors were actually performing basic management functions. The primary 'roadblock' was the need for criteria to determine where contractor assistance ends and performance begins in carrying out a basic management function.

AD-A108 433/4 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
State Field Offices are not Protecting Social Security Beneficiary Information from Potential Abuse and/or Misuse.
30 Sep 81, 45p Rept no. GAO/HRD-81-151
Report to the United States Congress.

Social Security gives personal beneficiary information to States for their use in administering federally financed public assistance programs. State field offices are not adequately protecting such information, and the Department of Health and Human Services (HHS) has not developed a consistent and comprehensive security program for States to use in protecting it. GAO recommends that the Secretary of HHS do so. (Author)

AD-A108 441/7 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Accounting and Financial Management Div.
State Highway Agencies Need to Employ Independent Auditors for Audits of Federal Funds.
30 Oct 81, 11p Rept no. GAO/AFMD-82-5
Report to The Secretary of Transportation.

Internal auditors' work is very useful to Federal agencies. Frequently, their work results in significant improvements which reduce costs and improve controls. Further, internal auditors can and have directly assisted principal, external auditors in performing Attachment P audits for the Federal Government. However, the main objective of internal auditors is to serve the organizations to which they report. This can impair their ability to be objective in citing violations by the State highway agencies they serve. Since it is generally recognized that audits of Federal-Aid highway programs can lead to State agencies owing the Federal Government significant amounts, it would be in the Government's and DOT's best interest to require State agencies to arrange for independent audits.

AD-A108 444/1 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Travel Policies and Practices of Department of Energy Grantees.
30 Sep 81, 6p Rept no. GAO/FPCD-81-76

DOE made 9,987 grants valued at $649,013,000 during fiscal year 1980. We selected 10 grantees for review. These included educational institutions, governmental entities, private companies, and quasi-governmental organizations. The sample was geographically dispersed and included grants of relatively high-dollar value (i.e., $50,000 or more) and grantees with multiple grants. The 10 grantees had 45 grants and spent about $17 million during fiscal year 1980. The 10 grantees made 1,194 trips costing $170,974, or about 1 percent of their grant funds spent during fiscal year 1980. Grantees' travel costs ranged from $331 to $46,512, and the number of trips ranged from 1 to 471. Most of the trips were generally associated with routine grant activities and included visits to gather and analyze data; trips to laboratories to conduct experiments; and meetings to review grant progress, conduct training, or provide technical assistance on energy matters. Ten trips costing $4,329 were made to attend conventions and symposiums. Of the 1,194 trips the grantees took, we categorized 184 trips costing $64,565 as trips made to attend conferences. For example, these included annual meetings, such as the 1980 Bio-Energy Conference, and trips to confer with DOE personnel on such matters as Energy Emergency Management Information Systems' implementation. The grantees in our sample made 46 trips to Washington, D.C., during fiscal year 1980 at a cost of $27,609. Of these trips, 13 costing $6,682 were made to meet with DOE personnel. The remaining trips were made to attend conferences and meetings with other Federal agencies and to conduct grant-related research.

AD-A108 453/2 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. International Div.
Identifying Marginal Activities Could Help Control Growing U.N. Costs.
30 Sep 81, 35p Rept no. GAO/ID-81-61
Report to the Secretary of State.

To control growing costs in the United Nations, U.N. member countries want to shift resources from completed, obsolete, marginally useful, and ineffective activities to new activities. These countries have repeatedly called upon the Secretary General to identify these marginal activities so that they can be terminated. Despite 5 years of effort, an inconsequential number of activities have been identified. A negligible effect on the U.N. budget has resulted. The Secretary of State should intensify efforts to gain compliance by the Secretary General in identifying these activities. (Author)

AD-A108 457/3 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Uncertain Quality, Energy Savings, and Future Production Hamper the Weatherization Program.
26 Oct 81, 51p Rept no. GAO/EMD-82-2
Report to the Congress of the United States.

The Department of Energy's Low-Income Weatherization Program could reduce the energy bills of about 12 million low-income households and affect the Federal fuel assistance program. Although weatherization production has increased recently, the outlook for maintaining the higher level beyond 1981 is doubtful because: the higher production was sustained by a large carryover of unspent funds from prior years; the cost per unit will likely increase due to more reliance on contract services; and 1982 budget proposals will affect production and unit costs. The program has also been hampered by poor workmanship, inadequate data on energy savings, and inadequate financial management and program monitoring at the Federal, State, and local levels. (Author)

AD-A108 459/9 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
Allegations of an Inappropriate Army Sole-Source Award for Commercial Construction Equipment.
15 Oct 81, 8p Rept no. GAO/PLRD-82-13
Report to the United States Senate.

The objective was to assess the appropriateness of and justification for the Army's decision to buy construction equipment from Caterpillar Tractor Company on a sole-source basis. To accomplish our objective, we reviewed (1) Army procurement regulations and policy concerning sole-source procurements, (2) the proposed contract and support files at TACOM and the industry correspondence files maintained by the Military Equipment Research and Development Command (MERADCOM) at Fort Belvoir, Virginia, and (3) cost data, parts commnality information, and industry worldwide support capabilities. In addition, we interviewed TACOM, MERADCOM, and construction equipment industry officials. We found that several other suppliers could have furnished the equipment and that the Army had ample opportunities to solicit this procurement competitively. By using a 'fleet-buy' concept (restricting consideration only to those firms that could manufacture all of the desired pieces of equipment), the Army eliminated several potential suppliers.

AD-A108 461/5 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.

Two Navy Ship Contracts Modified Under Authority of Public Law 85-804--Status as of August 3, 1980.
6 Oct 81, 76p Rept no. GAO/PLRD-82-8
Report to the Congress of the United States.

The 1979 Defense Appropriation Authorization Act requires the Comptroller General to review two contracts for the landing helicopter assault and the DD-963 destroyer ships. The review is to ensure that funds authorized for payments under contract modifications made in the interest of national defense are being used only on the two contracts and that the contractor does not use such funds to realize any total combined profit. GAO found that the funds are being spent as intended and that the contractor continues to project an overall loss on the contracts. This loss, however, reflects a significant improvement from the estimated loss during the 1978 shipbuilding claims settlement. (Author)

AD-A108 462/3 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
Use of New and Minority-Owned Architectural and Engineering Firms by Selected Army and Navy Activities.
30 Oct 81, 16p Rept no. GAO/PLRD-82-7
Report to the Honorable Ronald V. Dellums, House of Representatives.

Our objectives were to determine whether (1) A/E contracts are confined to a small number of firms and (2) the success, or lack of success, new and minority-owned firms have in being considered during the selection process for contract awards. We reviewed and discussed with selected officials at the Corps of Engineers' South Pacific Division and Sacramento District and NAVFAC's Western Division, policies, procedures, and practices used in selecting A/E firms. We also interviewed selected A/E firms (minority and non-minority owned) which had submitted proposals on two or more of the sampled A/E selections but had not made the preselection short-list in one or both agencies. We randomly sampled fiscal year 1980 A/E selections at the Corps' Sacramento District and NAVFAC's Western Division to evaluate the participation and success of new and minority-owned firms in the selection processes. Also, at both locations, we analyzed award histories for all firms awarded A/E contracts during fiscal year 1980 to determine whether they were confined to a relatively small group of contractors. It does not appear that such awards are confined to a relatively small group of contractors as alleged.

AD-A108 478/9 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
A New Headquarters/Field Structure Could Provide a Better Framework for Improving Department of Energy Operations.
3 Sep 81, 76p Rept no. GAO/EMD-81-97
Report to the Chairman, Committee on Governmental Affairs United States Senate.

DOE's organization structure could be improved to provide a better framework for effectively and efficiently responding to and accomplishing departmental requirements. Under its current organization structure, many head-quarters program and functional managers do not have authority to direct and control the field staffs who implement their program and functional requirements. By providing these managers with direct lines of authority over their respective field staffs, they should not only have authority commensurate with their responsibility, but should be more accountable and able to hold field staff more accountable for achieving their goals and objectives. GAO recognizes that many of the problems identified in this report may not be entirely attributable to the organization structure. In many instances improved management practices are needed. Nonetheless, when the audit examples and questionnaire results are considered collectively, GAO believes they clearly demonstrate that the direct line authority organization structure is superior and warrants serious consideration by the Department. (Author)

AD-A108 481/3 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
Relocating Social Security's Central Computer Operations: Recent Agency Planning and Management Has been Good, but Further Precautions Should be Taken to Reduce Risks.
1 Sep 81, 9p Rept no. GAO/HRD-81-134
Report to the Committee on Government Operations, House of Representatives.

As part of the comprehensive review of the Social Security Administration's (SSA's) systems development plans, we have been monitoring the agency's efforts to relocate its central computer facility from its present location at agency headquarters in suburban Baltimore to a newly constructed computer center building less than a mile away. Although we identified several questionable aspects of SSA's early relocation planning, the agency has acted to resolve these issues and has generally planned and managed the relocation activities well. Nevertheless, SSA's service to the public could be adversely affected if the agency installs service-related systems in the new building before it is totally ready to accept computer operations. Therefore, we believe SSA should closely monitor efforts to solve certain problems that have impeded building readiness and adjust its schedule for relocating service-related systems accordingly.

AD-A108 531/5 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Increased Agency Use of Efficiency Guidelines for Commercial Activities Can Save Millions.
30 Sep 81, 7p Rept no. GAO/FPCD-81-78

We have completed a limited survey of the Office of Management and Budget's (OMB's) program to increase the efficiency of commercial or industrial-type activities in the Government (referred to hereafter as commercial activities). We believe OMB might be able to save millions of dollars by requiring wider agency usage of OMB guidelines on developing performance standards. These OMB guidelines, originally issued to help assure that contract personnel perform required Government services at the lowest possible cost, can also be used to help assure that in-house personnel perform required services at the lowest possible cost by identifying unnecessary or inefficient work practices. Through its participation in the efficiency review program, the Department of Defense (DOD) has reported staffing reductions of about 600 personnel spaces, saving about $30 million over a 3-year period. However, the civilian agency with the largest commercial activity annual operating costs, the General Services Administration (GSA), has not followed the OMB guidelines on performance standards. As a result, its costs are higher than necessary. We are recommending that you take action to assure that all agencies follow the OMB guidelines.

AD-A108 534/9 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Accounting and Financial Management Div.
Review of a Computer Hardware Acquisition for the National Oceanic and Atmospheric Administration in Boulder, Colorado.
25 Sep 81, 9p Rept no. GAO/AFMD-81-92
Report to the Committee on Government Operations, House of Representatives.

This study found: (1) The Boulder computer center is not following a pattern of noncompetitive acquisitions; (2) The recent sole-source procurement of computer hardware appears to be justified as an interim bridge to a fully competitive procurement in 1982; (3) The Boulder computer center does not appear to be mismanaged; (4) The bid protest by Computer Maintenance Technologies, Inc., was rejected by the Department of Commerce, and the company chose not to pursue the protest further with use, and (5) We have serious concerns about the adequacy of ERL's planning for their future computer resource needs.

AD-A108 537/2 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
Two Contracts for Nuclear Attack Submarines Modified under Authority of Public Law 85-804--Status as of December 20, 1980.
20 Oct 81, 22p Rept no. GAO/PLRD-82-2
Report to the Congress of the United States.

The 1979 Defense Appropriation Authorization Act requires the Comptroller General to review two specific contracts for SSN-688 class nuclear attack submarines. The review is to insure that funds authorized for payments under contract modifications made in the interest of national defense are being used only on the two contracts and that the contractor does not use such funds to realize any total combined profit. GAO fund that the funds are being spent as intended and the contractor is still projecting losses. In addition, the contractor is seeking to recover from the Navy, under insurance provisions of the contracts, costs incurred to correct defective workmanship and has submitted the first of a number of proposed claims. (Author)

AD-A108 543/0 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Accounting and Financial Management Div.
Non-Federal Computer Acquisition Practices Provide Useful Information for Streamlining Federal Methods.
2 Oct 81, 30p Rept no. GAO/AFMD-81-104

GAO's study of 18 non-Federal organizations showed that their managers are committed to using the computer effectively as a tool for achieving business goals. Their strategies and plans provide a framework and operational direction for computer acquisitions. Their practices and procedures are understood, followed, and consonant with normal business practices. GAO found that the 18 organizations studied normally completed computer equipment acquisitions in under a year. This study discusses their practices and procedures. While GAO does not endorse the specific procurement practices, we believe Federal agencies should consider using the other practices to streamline their acquisition processes within the context of current laws and regulations. (Author)

AD-A108 559/6 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Accounting and Financial Management Div.
Review of the Disabled American Veterans' Financial Statements for the Year Ended December 31, 1980.
15 Oct 81, 19p Rept no. GAO/AFMD-82-8
Report to the Congress.

GAO reviewed the report on the audit of the Disabled American Veterans' (DAV's) 1980 financial statements and the work of DAV's independent public accountant. GAO concurs with the opinion of DAV's accountant and transmits it to the Congress. Separate sections of the United States Code require annual audits of DAV's accounts by both GAO and independent public accountants. GAO believes these duplicate efforts provide little additional benefit to DAV and other users of the audit reports. They also result in a greater expense to DAV than would otherwise be necessary, and a less effective use of GAO's resources. Therefore, GAO recommends that DAV's authorizing legislation (36 U.S.C. 90i(b)) be amended to eliminate the requirement for an annual audit of DAV's financial statements by GAO.

AD-A108 560/4 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Accounting and Financial Management Div.
Federal Agencies Still Need to Develop Greater Computer Audit Capabilities.
16 Oct 81, 86p Rept no. GAO/AFMD-82-7
Report to the Congress.

As the Federal Government becomes increasingly dependent on computers it is even more important for auditors to ensure that computer system controls are designed and operating properly; and that computer equipment, programs, personnel, and other resources are used efficiently, effectively, and economically. Past GAO reports recommended that audit organizations do more computer auditing. In addition, the Comptroller General of the United States has issued audit standards which outline government auditors' responsibilities to audit computer-based systems. Some audit organizations have conducted effective computer audits. However, many Federal audit organizations have neither recognized their computer audit responsibilities nor developed the skills to meet them. This report recommends actions every Federal agency should take to define, develop, and maintain appropriate computer audit capabilities.

AD-A108 562/0 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
The Department of the Interior's Office of Aircraft Services Should Not be Abolished.
7 Oct 81, 65p Rept no. GAO/PLRD-82-5
Report to the Chairman, Committee on Interior and Insular Affairs, House of Representatives.

The Department of the Interior's Office of Aircraft Services was established in July 1973 with responsibil-

ity for managing aircraft services to meet Interior's needs. In March 1981, Interior ordered the Office abolished on September 30, 1981. The Secretary of the Interior should rescind the order to abolish the Office of Aircraft Services, unless it can be clearly shown that decentralization of aircraft services would be cost effective and would not jeopardize flight safety. (Author)

AD-A108 563/8 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
Conventional Design and Construction Methods are More Applicable for Capitol Hill Construction Projects.
30 Oct 81, 81p Rept no. GAO/PLRD-82-1
Report to the Congress.

Over the past 4 years, at the requests of either a committee or Members of Congress, we have reviewed the major construction projects of the Architect of the Capitol (AOC). These reviews have resulted in the issuance of individual reports on three projects all containing similar findings that AOC construction projects experience significant cost overruns, completion delays, and management problems. These same conditions are also evident on the latest AOC project nearing completion--the modifications and enlargement of the Capitol Power Plant. The AOC is planning a major restoration project involving two Library of Congress buildings. Unless care is taken to avoid the types of problems experienced on the other projects, the proposed restoration project could also encounter cost overruns and completion delays. Our previous reports were concerned primarily with cost overruns and completion delays. In accordance with the intent of the requesters, the reports contained no recommendations concerning the way AOC projects are approved, funded, designed, constructed, and managed. This report updates our previous studies of three Capitol Hill projects, identifies the underlying causes for the AOC's problems, and informs the Congress of changes needed to help minimize or alleviate the pitfalls that have plagued previous Capitol Hill projects. (Author)

AD-A108 565/3 PC **A04**/MF **A01**
Army Missile Command, Redstone Arsenal, AL. Systems Engineering Directorate.
Guide for Transitioning Army Missile Systems From Development to Production.
Technical rept.
Jul 81, 66p DRSMI/RS-81-6-TR, SBI-AD-E950 183

One of the most important steps in the life cycle of a new missile system is the transition from development into production. It encompasses completion of engineering development; a successful outcome of the milestone review process for production entry; initiation of the activities needed for production start-up; and routine manufacturing of the missile system. Because of the large number of diverse events that must be successfully orchestrated to achieve the transition, it is a complex and difficult challenge. This guide has been prepared to assist Project Managers for major and non-major systems in planning for and executing the transition for new missile systems.

AD-A108 647/9 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
Problems in the Multi-Service Acquisition of Less-Than-Major Ground Communications-Electronics Systems.
Masters's thesis,
Leland D. Cox, and David B. Wile. Jun 81, 172p Rept no. AFIT-LSSR-22-81

Acquiring defense systems which can be used by more than one service offers a potential for savings through elimination of duplicated efforts. Army and Air Force have been jointly acquiring satellite communications terminals; however, evidence exists that these joint service programs have experienced many problems. The authors discovered problems in many areas. These areas included management information, coordination between services, provisioning, funding, and training. Computer systems used in the individual services are not compatible, resulting in costly, time-consuming manual workarounds. Problems arise in cross-coordination between services because of different procedures, formal guidance, and terminology. The major area of difficulty is provisioning; here, procedural differences are most noticeable. Funding problems result in service parochialism as attempts are made to protect service funds. Finally, there has been little specific training for personnel assigned to multi-service programs. After discovering these major problem areas, the authors make specific recommendations for improvement, as well as outlining several key areas for further research. (Author)

HRP-0903815/9 PC **A03**/MF **A01**
Texas Univ. at Austin.
Health Block Grants and Texas,
Helen Austin, and Mary Walker. Jul 81, 29p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. Prepared in cooperation with Sid Richardson Foundation, Fort Worth, TX., Moody Foundation, Galveston, TX., and Meadows Foundation, Dallas, TX.

Block grants are broad purpose allocations of Federal funds to state and local governments. Block grants give the grant recipient wide latitude in the use of funds within a broadly designated area and place the responsibility for planning, administering, and evaluating funded programs with the grant recipient. Categorical grants, in contrast, designate funds for specific purposes and retain program control at the Federal level. In Texas, planning for and administration of the Partnership for Health Act of 1966 (314d) block grant involved both the Department of Health Resources and the Department of Mental Health and Mental Retardation. No single agency had overall authority for 314(d) block grant funds; no mechanism was established to include interested parties in the planning process; and evaluation of the utilization of 314(d) funds was difficult. Procedures for allocating funds from the Reagan Administration's health block grant proposal, as modified and enacted by Congress, have yet to be established. The planning, administration, and evaluation of these block grant funds must pay particular attention to the unique health care needs of rural Texans. References and a table are included.

HRP-0903836/5 PC **A06**/MF **A01**
Central Pennsylvania Health Systems Agency, Inc., Lewisburg.
Recruiting Primary Care Physicians in Underserved Areas in Central Pennsylvania.
Aug 80, 122p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Procedures for recruiting physicians by community health care facilities and private practices are examined. The actual process of advertising, contacting, and interviewing prospective physicians requires the involvement of several prominent community members. This process must be coordinated if it is to be productive. Prerequisite recruiting activities for primary care centers involve position descriptions, wage and salary schedules, and building construction and equipment purchases. The recruitment process must incorporate all community resources, such as hospitals, nonprofit placement services, commercial placement services, and the National Health Service Corps. Vacant positions can be advertised by flyers, periodicals, newspapers, and local health personnel. Following the applicant interview, the personnel committee should thoroughly investigate the individual's references. Specific issues concerning physicians' rural practice expectations deal with education and licensure, primary care specialties, salaries, and foreign medical graduates. Inducements to solo practice physicians encompass backup and coverage arrangements with other local physicians, a guaranteed minimum income, and low-rent or rent-free office space. Operation of the Central Pennsylvania Health Personnel Clearinghouse is noted. Appendixes offer additional information on physician residency programs and manpower shortage areas.

ORNL-5277 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Computerized Management Report System for Monitoring Manpower and Cost.
V. R. Bullington, R. L. Stephenson, and R. G. Cardwell. Apr 80, 26p
Contract W-7405-ENG-26

Although most cost systems offer complete detail and traceability, not all provide timely detail in a concise form useful to senior management. This system was developed for a multifunction research organization funded from many sources. It extracts cost and manpower data from the general cost systems, summarizes it, compares it by program with previous cost periods, and presents it with minimum detail yet with maximum overview. The system monitors the basic manpower distribution of effort at the source, that is, the division time-card input. Cost data are taken from the central computer ahead of the print-out and report-distribution steps; thus, the summary information is available several days ahead of the detailed reports. This procedure has been regularly used for several months, and has proven to be a valuable tool in management action and planning. 9 figures. (ERA citation 05:018924)

PB82-136276 PC **A04**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Special Investigation Report: Air Traffic Control System.
8 Dec 81, 60p NTSB-SIR-81-7

This National Transportation Safety Board special investigation of the air traffic control system in the United States followed a strike, on August 3, 1981, of the Professional Air Traffic Controllers Organization (PATCO) against the Federal Aviation Administration (FAA) which resulted in the walkout of about 11,400 of the 17,275 controller workforce. The strike left the air traffic control (ATC) system with a significantly reduced air traffic capacity which ranged from 75 percent to 83 percent of the prestrike scheduled commercial air carrier levels. The special investigation was conducted in August and September 1981. Forty-five ATC facilities were surveyed and about 220 controllers and supervisors were interviewed. Industry and government officials were questioned on ATC procedures and flight operations in the poststrike ATC system. The investigation included an analysis of ATC data, the ability of the FAA to meet staffing requirements, the qualifications of the controller workforce, training for new controllers, the effect of stress and fatigue, facility supervision and management, the control of the capacity of the system, and computer and equipment reliability. The Safety Board concluded that no basic ATC procedures were changed or compromised in order to keep the ATC system in operation, and that the high level of ATC safety required is possible within the present system and will be possible as the system is rebuilt. The Safety Board made a number of safety recommendations to the FAA designed to enhance ATC system safety.

PB82-138819 PC **A07**/MF **A01**
Performance Development Inst., Washington, DC.
Toward Competitive Provision of Public Record Message Services.
Interim rept.,
Michael A. Mulkey, and Kevin P. Timpane. Oct 81, 149p NBS-GCR-ETIP-81-97
Contracts NBS-7-35822, NBS-78-3603

This report describes the current status of a cooperative project involving the Experimental Technology Incentives Program (ETIP) of the National Bureau of Standards and the Federal Communications Commission. The partnership was initiated in 1977 as one of several similar ETIP efforts to develop knowledge useful to policymakers on the interaction between regulation and private sector innovation. This volume reports on market trends evolving in the wake of the FCC opening up public message communication services to competition. The report concludes that while a few firms have entered the market to offer the public record message telecommunications services on a nonsubscription basis, these services are oriented toward use by businesses, not the individual, occasional user. While development in public message services has been slow, the area of business-oriented subscription record and data telecommunications and teleprocessing services has been very active. The report calls out regulatory issues worth resolving in order to ensure public availability and affordability of new services.

PB82-140054 PC **A04**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
Financial Analysis of Local Governments.
Final rept.,
M. Wayne Stansbery. Dec 81, 59p 136-80-VIII
Sponsored in part by Farmers Home Administration, Washington, DC.

This paper is designed to serve as a manual to assist Farmers Home Administration (FmHA) staff with the assessment of overall financial condition of rural governmental bodies that have multiple functions. The emphasis is on overall financial condition, rather than

the enterprise being financed. The paper is primarily a summary of pertinent material from other published works. A brief description of fund accounting is given, highlighting basic differences between accounting for commercial business and accounting for government. Factors to be considered in financial analysis of local governments are discussed under the headings of economic base, financial statement, debt burden, and administrative. A worksheet is provided that may be photocopied and used as a checklist to summarize an analysis.

PB82-140492 CP **T02**
Office of Management and Budget, Washington, DC. Budget Review Div.
Catalog of Federal Domestic Assistance, 1981 (First Update).
Data file,
Robert Brown, and James Adam. Dec 81, mag tape OMB/DF-81/006
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The file reflects all the textual material published in the program descriptions section of the Catalog of Federal Domestic Assistance, 1981 (updated December 1981). There are 1,081 programs. In addition, a characteristics record is included for each program. These contain information extracted and coded from the textual material, for use with the accompanying documentation.

PB82-141268 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
Planning for and Purchasing Computer Technology: A Preliminary Guide for Small Communities,
S. David Bagwell, and Gerald W. Price. Nov 79, 37p PTI-79-300, NSF/RA-790745
Grant NSF-ISP79-18742
Prepared in cooperation with National League of Cities, Washington, DC., and International City Management Association, Washington, DC.

An approach is presented for assessing computer requirements of small, local jurisdictions. The steps for acquiring a computer are outlined. Topics addressed include: organizing a planning committee; meeting guidelines and procedures; preparing guidelines and instructions for computer functions; choosing hardware (equipment) and software (programs); bidding procedures and follow-up guidelines; and implementation aids and instructions. The steps and guidelines are meant to be read by the chief administrative officer involved in decisionmaking and any other pertinent personnel involved in overall planning efforts.

PB82-141516 PC **A03**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
An Organization Development Effort to Improve Group Dynamics in the National Heart, Lung, and Blood Institute Planning Process.
Final rept.,
Luiz Horta Barbosa. Nov 81, 36p
Sponsored in part by National Institutes of Health, Bethesda, MD.

This study examines the application of an Organization Development (OD) intergroup intervention to reduce tension, conflict and dysfunction between the two groups responsible for setting priorities and developing new initiatives related with Blood Diseases and Blood Resources, one of the program areas of the National Heart, Lung, and Blood Institute. It is not uncommon for a significant amount of dysfunctional energy to be spent in competition, misunderstanding, miscommunication, and misperception between groups. This OD intervention focuses on the collaborative inquiry feature of the action research model - a databased, problem-solving model that replicates the steps involved in the scientific method of inquiry. The rationale, design and application of the action research model is examined in this report, and the overall effectiveness of the approach is discussed.

PB82-142670 PC **A04**/MF **A01**
Federal Conversion Support Center, Falls Church, VA.
Preparing Software Conversion Studies.
Final rept.
Jul 81, 70p GSA/FCSC-81/002

A Conversion Study as required by FPR 1-4.1109-13 is a procurement planning document. It should be conducted as early in the procurement cycle as possible. Ideally, it would be conducted when it has been determined that additional computing resources are required and that the most cost effective method of satisfying that requirement is to procure new or replacement hardware or teleprocessing support. The conversion study should be a major input in establishing the procurement strategy which has the lowest overall cost to the Government and encourages competition to the maximum extent practicable. This document contains an outline that provides an agency with a suggested format and level of detail for each area of the conversion study, including sample forms and examples.

PB82-142696 PC **A02**/MF **A01**
National Inst. for Metallurgy, Randburg (South Africa).
The Organizing of Conferences,
L. F. Haughton. 18 Sep 81, 18p NIM-2130, ISBN-0-86999-556-1

The Liaison and Information Division of the National Institute for Metallurgy (NIM) has been concerned in the planning and organizing of conferences. local and international, large and small, for many years, and, as the result of trial and error has acquired a fair amount of knowledge of the subject and developed a successful modus operandi. It is felt that the knowledge and expertise gleaned over the years should be made available generally for use by interested organizers.

PB82-145079 PC **A02**/MF **A01**
Federal Conversion Support Center, Falls Church, VA.
Conversion Contracting Techniques Associated with Procurement of a Replacement ADP Hardware System.
Final rept.
Sep 81, 17p GSA/FCSC-81/003

This document is a discussion paper that addresses various procurement strategies for obtaining conversion services associated with the procurement of a replacement hardware system or timesharing service. Conversion associated costs are usually significant and must be considered when evaluating proposals for replacement hardware and teleprocessing services (FPR 1-4.1109-15). This paper addresses five possible methods for procuring conversion services with a hardware replacement.

PB82-145608 PC **A10**/MF **A01**
National Research Council, Washington, DC.
Nuclear Science in China.
Sep 80, 215p ISBN-0-309-03086-2
Library of Congress catalog card no. 80-819616. Sponsored in part by National Science Foundation, Washington, DC.

The visit upon which this report is based was undertaken under the aegis of the Committee on Scholarly Communication with the People's Republic of China. The delegation was in China from May 21 through June 9, 1979. The formal host in the People's Republic was the Chinese Academy of Sciences, and the Institute of Atomic Energy also played an essential role in organizing and expediting the activities. The report is organized as follows: It begins with a general discussion of the organization of research and educational activities in China as a framework for subsequent discussion of details. Following overview sections on Chinese science and education policy and on nuclear science activities, more detailed reports are given on visits to five quite different universities and to seven different research institutes. This is followed with brief sections on the visit to the Vanguard factory, to the silk and dye factory in Hangzhou, and to the Shanghai Industrial Exhibition. The report concludes with impressions of Chinese industrial development, general impressions in a number of topical areas, a few overall conclusions, and finally a number of appendixes pertaining to the travel.

PB82-145798 PC **A04**/MF **A01**
Oregon State Executive Dept., Salem.
Office of Science and Technology, State of Oregon, Twenty-four Month Report.
Final rept.,
G. E. Miller. Dec 78, 63p NSF/RA-780885
Grant NSF-ISP77-18873

The development and testing of a plan is outlined for the transfer and systematic utilization of existing technology to solve short-term problems faced by local and state governments in Oregon. The plan consists of twelve tasks, each of which are examined in detail and evaluated. In addition, an analysis is provided for other states that may wish to establish an Office of Science and Technology (OST) program. Specific tasks are as follows: (1) acquainting state department heads with the technology transfer office; (2) becoming acquainted with the League of Oregon Cities and the Association of Oregon Counties; (3) acquainting the state university agricultural extension service with OST; (4) initiating on-site visits to city, county, and state agencies around the state; (5) setting up regional workshops for law enforcement officials; (6) arranging for a Federal Laboratory Consortium meeting; (7) participating in Pacific Northwest Innovation Group meetings; (8) preparing an implementation plan for institutionalizing the OST; (9) developing an evaluation format for OST; (10) preparing technical briefs on Oregon innovations; (11) training state employees for continuation of the OST office; and (12) preparing reports.

PB82-145814 PC **A05**/MF **A01**
Upper Plains States Innovation Group, Bismarck, ND.
Upper Plains States Innovation Group, Final Report.
Jul 81, 89p NSF/ISP-81023
Grant NSF-ISP80-07661

The study focuses on identifying those technologies which would yield substantial near-term cost benefits for cities and counties in North and South Dakota, Montana, and Wyoming--members of the Upper Plains States Innovation Group (UPSIG). In addition to work accomplished by UPSIG on the technical needs of local government, several modifications to methodologies for addressing these needs are identified. The report consists mainly of appendices on the status of tasks performed; a research and development agenda, including a description of ten priority areas to be researched; a description of UPSIG products; and findings on a NASA Landsat remote sensing project. The purpose of the NASA project is to identify potential local government applications for Landsat technology on the UPSIG region and alternative institutional arrangements through which cities and counties could access Landsat and other remote sensing data on an as-needed basis. Products of UPSIG include the following: (1) guidebooks for upgrading paved roads, selecting equipment for pothole patching, reducing park vandalism, containing costs and increasing revenues for municipal swimming; and (2) workshops on fire prevention planning, arson task forces, and Dutch elm disease control.

PB82-147398 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Program Analysis Div.
Small Businesses Are More Active as Inventors Than as Innovators in the Innovation Process.
31 Dec 81, 23p PAD-82-19

In this report, GAO analyzes a number of studies that examine sources of invention and innovation and presents conclusions drawn from these studies about the contributions of small businesses to the innovation process. GAO concludes that small businesses have been important contributors to the innovation process and that they have been more active in invention than in innovation (actually brining an invention to market). While GAO was not able to generalize from the existing evidence to specify the level of small businesses' future contributions, no evidence was found to suggest that they might be less important to invention and innovation in the future than they have been in the past.

PB82-147786 PC **A05**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
An Assessment of the Need and Impact of Public Law 95-507, A Project in Managerial Problem Solving.
Final rept.,
Edward L. Girovasi, Jr. Dec 81, 95p 142-80-IX
Sponsored in part by Department of Housing and Urban Development, Washington, DC.

Public Law 95-507, the Amendments to the Small Business Act of 1958, made several major policy changes with respect to the level of assistance provided to small businesses by the Federal government. This study focuses on what is generally considered the most significant portion of the Amendments - the mandatory subcontracting plans of Section 211. The need

and impact of the subcontracting requirements of Section 211 are critically reviewed based on the experience of one Federal agency - the Department of Housing and Urban Development (HUD).

PB82-147802 PC **A05**/MF **A01**
Southwest Innovation Group, Inc., Pasadena, CA.
Southwest Innovation Group, Final Technical Report.
Oct 79, 77p NSF/RA-790748
Grant NSF-ISP78-00784

The objective of this project was to provide for a regional network design and the expansion of the California Innovation Group to furnish a test bed for the design. The name of the organization was changed to the Southwest Innovation Group, Inc., (SIG) and the cities of Phoenix and Scottsdale, Arizona were added to the regional program. The development of a plan for establishing a design for science and technology (S&T) innovation is described and reproduced as a model regional S&T network preliminary design document. Based on further stated objectives, the report (1) identifies which elements of the plan could be shown as positive contributors to the functioning of a regional network; (2) describes testing of the model design through its application to cities outside California; (3) examines the feasibility of using existing organizations and agencies to strengthen network alternatives; and (4) describes the development and documentation of organizational, financial, and working procedures, and intergovernmental implementation alternatives for consideration based upon this experiment. The support elements described include brokerage and information exchange services; dissemination services; evaluation and documentation; technical assistance to member and expansion cities; general management support for special projects; and general administrative support.

PB82-147851 PC **A03**/MF **A01**
National League of Cities, Washington, DC.
Policy Makers' Views on the Application of Research and Technology to Local Government: A Preliminary Assessment.
8 Jun 81, 31p NSF/ISP-81025
Grant NSF-ISP80-17279

The role of technology and reserch in the public sector is discussed in an attempt to identify programs or approaches sponsored by the Federal government which have been effective or could be enhanced by local governments. Major topics examined include: (1) the need for a national communications network; (2) the risk element in the application of new technology; (3) technical assistance and training for local governments; and (4) local government direct participation in science and technology agenda-setting. It is noted that local government officials are, in essence, searching for technology which has a potential for reducing or at least stabilizing the costs of community services and improving the productivity of those services and the manner in which they are provided.

PB82-147943 PC **A06**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
An Evaluation of the Implementation of the Standard Accounting and Reporting System.
Final rept.,
Gwendolyn Y. Washington. Dec 81, 103p 180-80-VII
Sponsored in part by Office of the Comptroller (Navy), Washington, DC.

This report studied the design and implementation of the Standard Accounting and Reporting System, known as STARS. The Comptroller of the Navy authorized the implementation of STARS on October 1, 1980. The use of the STARS program caused the Navy some immediate problems. There was more information available than could be utilized. Many STARS reports are not used by managers which may indicate that they do not provide the information required by the managers.

PB82-147976 PC **A04**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
A Conceptual Design of an Accounting Operations Productivity Measurement System for the Department of Health and Human Services.
Final rept.,
Michael J. Najjum, Jr. Dec 81, 73p 144-80-IX
Sponsored in part by Department of Health and Human Services, Washington, DC.

The Department of Health and Human Services (HHS), like private industry, has limited resources to achieve its organizational goals. A productivity measurement system is the approach needed at HHS to obtain an overall, quantified measure that can be used by Departmental management to assess its relative efficiency. A productivity measurement system has the potential to provide the following benefits: (1) gather data to advise management on forecasting and evaluating man power; (2) data for improvements to the productivity operation; (3) data to support annual budget requests to the Office of Management and Budget; and (4) data to control day to day decisions to maximize the achievement of goals. This paper's purpose was to develop a conceptual design of a productivity measurement system for accounting operations in HHS. The primary recommendation was the financial offices of HHS to develop and implement a productivity measurement system for their accounting operations. The other recommendations are: (1) use the direct time study technique to set production standards; (2) equivalent unit values should be established; (3) top management must give their personal support; and (4) employees, unions, and line supervisors must be kept informed of the progress and decisions, and be represented on the productivity team in their areas.

PB82-153750 PC **A12**/MF **A01**
Intermediate Technology Publications Ltd., London (England).
The Small Building Contractor and the Client (El Contratista de Obras de Pequena Escala y el Cliente),
Derek Miles. 1980, 254p
Text in Spanish.

This report deals with the management of the building construction in relation to the various suppliers and persons he will have to contact to get his buildings contracts, as well as bidding to obtain his contracts. Examines the most economical ways to get his materials and budgets considering his costs for the main plant as well as the supervision of the construction site. The management of personnel, samples of letters, bills, meetings, and other managerial aspects of the business such as insurance and the drawing of bids are considered.

UCID-18847(Pt.2) PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Project Management Code. Part 2. Conceptual Design.
H. S. Ames. 11 Nov 80, 73p
Contract W-7405-ENG-48

This document describes the conceptual design for an information management system called Project Management Code (PMC). PMC is a simple computerized tool that managers can use to plan, evaluate, and report the technical and financial progress of a project by using the work breakdown structure (WBS) as the graphical means of representing input and output. PMC provides an automated means to develop and maintain the WBS for a project interactively. The conceptual design describes PMC from the user's point of view and includes operating procedures, commands, and reports. 26 figures, 1 table. (ERA citation 06:006800)

5B. Documentation and Information Technology

AD-A108 526/5 PC **A04**/MF **A01**
INCO, Inc., McLean, VA.
ORACLE versus IDM Comparative Analysis.
10 Nov 81, 65p
Contract N00014-81-C-0808

This document contains: a description of ORACLE SQL. Familiarity with the ORACLE manual is subsumed; SDL/DS features are described; a description of IDL and its relationship to the IDM commands; the correlation between SQL and the IDM features; additional IDM features not available within SQL; and unimplemented features of full SEQUEL.

AD-A108 538/0 PC **A05**/MF **A01**
General Accounting Office, Washington, DC.
United States General Accounting Office Publications List.
30 Jun 81, 92p

This pamphlet lists reports of GAO audits and surveys of U.S. Government activities issued from January 1 through June 30, 1981. Following the list of reports, which are categorized according to Government function, is a list of testimony presented by GAO officials before congressional committees during the same period.

AD-A108 612/3 PC **A02**/MF **A01**
Delaware Univ., Newark. Dept. of Computer and Information Sciences.
Prerequisites to Deriving Formal Specifications from Natural Language Requirements.
Final rept. 1 Jul 80-31 Aug 81,
Ralph M. Weischedel. Oct 81, 21p AFOSR-TR-81-0798
Grant AFOSR-80-0190

Since English specifications and formal specifications of modules are complementary and since formal specifications require so much effort to write, our work is investigating application of artificial intelligence techniques to aid in the software specification process. The first area studied is comparing English descriptions with formal specifications of the same software module. This work is now complete; however, some of the examples will continue to serve as a guide to the software tool being constructed. The second area is suggesting modifications to formal specification languages, which would make them more understandable. In particular, we have been suggesting alternatives to logical quantifiers. The third and fourth areas deal with the syntactic and semantic components of an experimental software tool. Its purpose is to test our solutions to a handful of problems in transforming English descriptions to formal specifications under significant user assistance. In dealing with syntactic ambiguity, one of the solutions that many have spectulated about is the use of a semantic component to reject anomolous parses; we intend to test its effectiveness using the RUS grammar. When ambiguity is not resolved, questions must be presented to the user for his/her selection of the intended interpretation. Partial heuristics for this are part of the results of this year's effort. In addition, modification of the RUS parser and dictionary for the domain of software specification will continue during the next year.

AD-A108 672/7 PC **A05**/MF **A01**
Air Force Systems Command, Washington, DC.
Patent Abstract Digest. Volume I.
Interim rept.,
Frank A. Lukasik. 30 Apr 79, 95p Rept no. AFSC-TR-81-65
See also Volume 2, AD-A108 673.

One page summaries of new technology generated under Air Force programs and protected by issued U.S. patents. Air Force owned patents are available for licensing under AFR 110-33. (Author)

AD-A108 673/5 PC **A06**/MF **A01**
Air Force Systems Command, Washington, DC.
Patent Abstract Digest. Volume II.
Interim rept.,
Frank A. Lukasik. Mar 81, 111p Rept no. AFSC-TR-81-66
See also Volume 3, AD-A108 674.

No abstract available.

AD-A108 674/3 PC **A06**/MF **A01**
Air Force Systems Command, Washington, DC.
Patent Abstract Digest. Volume III.
Interim rept.,
Frank A. Lukasik. Sep 81, 112p Rept no. AFSC-TR-81-67
See also Volume 1, AD-A108 672.

One page summaries of new technology generated under Air Force programs and protected by issued U.S. patents. Air Force owned patents are available for licensing under AFR 110-33. (Author)

DOE/TIC-4500(Rev.69) PC **A03**/MF **A01**
Department of Energy, Oak Ridge, TN. Technical Information Center.
Standard Distribution for Unclassified Scientific and Technical Reports: Instructions and Category Scope Notes.
Dec 80, 27p

The US Department of Energy Technical Information Center (DOE/TIC) uses a subject category scheme for classifying and distributing DOE-originated or -sponsored unclassified scientific and technical reports. This document contains the subject category scope notes used for these purposes. Originators of DOE or DOE-sponsored scientific and technical reports are urged to adhere to the instructions contained this publication. A limited number of copies of the unabridged version (addresses included) are available to Department of Energy offices and their contractors as DOE/TIC-4500(Rev.69)(Unabridged). (ERA citation 06:016342)

DOE-TIC-7000-R5-APP

PC**$14.00**/MF **A01**

Department of Energy, Oak Ridge, TN. Technical Information Center.
Subject Thesaurus Permutated Listing.
Oct 81, 240p

Entry to a large multidisciplinary thesaurus containing both single and multi-word descriptors presents problems to the experienced as well as the new user. This permutated listing has been prepared to alleviate these problems. Each descriptor has been permutated according to each significant word in single and multi-word entries and listed alphabetically. This type listing will (1) provide the user with the correct thesaurus entry and (2) permit review of generically related descriptors separated by alphabetization in the Thesaurus.

PB82-138629 PC **E08**/MF **E08**

National Technical Information Service, Springfield, VA.
Tech Notes: 1981 Annual Index.
Feb 82, 38p

The U.S. Government generates over 60,000 technical reports each year from its research and development effort. Because of the amount of this information, industry and businesses can have a difficult time in finding and utilizing new technology developed by the Government. For this reason, NTIS prepares a monthly subscription product called NTIS Tech Notes. Tech Notes are one or two page summaries (often with illustrations) of new processes and products determined to have potential utilization in both the public and private sectors. They are contributed by a number of sources including the Department of Energy (DOE), the National Aeronautics and Space Administration (NASA), the Department of the Army, the U.S. Bureau of Mines, and other Government agencies and their laboratories. This Annual Index provides citations for more than 800 Tech Notes announced by NTIS during 1981. It will provide current NTIS Tech Notes subscribers with an opportunity to access technology they may not have needed previously as well as access to those Tech Notes not covered in their subscription category. Non-subscribers to NTIS Tech Notes will find this Index useful since it allows them access to all of the technology covered by Tech Notes in the year.

PB82-143694 PC **A13**/MF **A01**

Coordinating Center Models Project, Baltimore, MD.
Coordinating Center Models Project: A Study of Coordinating Centers in Multicenter Clinical Trials. XVI. CCMP Manuscripts Presented at the Annual Symposia on Coordinating Clinical Trials.
Interim rept.
1 Jun 79, 290p
Contract N01-HV-62957.

This report has been developed as part of the Coordinating Center Models Project (CCMP). The CCMP is supported through a contract with the National Heart, Lung, and Blood Institute (NHLBI) and is designed to provide general information on the organization and conduct of multicenter trials with emphasis on the coordinating centers in such trials. This report contains CCMP manuscripts presented at the 1977, 1978, and 1979 symposia on Coordinating Clinical Trials. Topics included are: Organization and management principles as applied to coordinating center operation; activity analysis of data coordinating centers; cost profiles; and recommendations and comments on the organization of multicenter trials.

PB82-143702 PC **A03**/MF **A01**

Coordinating Center Models Project, Baltimore, MD.
Coordinating Center Models Project: A Study of Coordinating Centers in Multicenter Clinical Trials. II. RFPs for Coordinating Centers: A Content Evaluation.
Interim rept.
1 Mar 79, 47p
Contract N01-HV-62957

Ten Requests for Proposals (RFP) for coordinating centers or data coordinating centers which were issued by the National Heart, Lung, and Blood Institute (NHLBI) between March 1971 and January 1977 were selected for review as part of the activities of the Coordinating Center Models Project (CCMP). A special form was prepared to record and categorize the information contained in each RFP. Findings from this review are summarized in this report. All of the RFPs reviewed lacked informational details which the CCMP Research Group considered essential to the preparation of an informative response.

PB82-143710 PC **A03**/MF **A01**

Coordinating Center Models Project, Baltimore, MD.
Coordinating Center Models Project: A Study of Coordinating Centers in Multicenter Clinical Trials. XIV. Enhancement of Methodological Research in the Field of Clinical Trials.
Interim rept.
1 Sep 79, 40p
Contract N01-HV-62957

Research and development are needed to improve the design, organization, and operation of clinical trials. To date, such efforts have not been sufficient to keep pace with the expanding needs of the field. Reasons for this deficiency may be a lack of identity for the field of clinical trials and passive attitudes towards methodology, both by investigators who participate in clinical trials and agencies who sponsor them. This report focuses on measures which can be taken by investigators and sponsors to increase the amount and scope of methodological and developmental activities in clinical trials and to enhance the communication of methodological information for the field.

PB82-143728 PC **A02**/MF **A01**

Coordinating Center Models Project, Baltimore, MD.
Coordinating Center Models Project: A Study of Coordinating Centers in Multicenter Clinical Trials. IV. Terminology.
Interim rept.
1 Aug 79, 25p
Contract N01HV-62957

Terminology is an important part of any communication process. This report contains terminology in current use and the terminology conventions of the Coordinating Center Models Project (CCMP) and serves as a resource and reference for other reports in the series of technical reports prepared by the CCMP Research Group.

PB82-143736 PC **A08**/MF **A01**

Coordinating Center Models Project, Baltimore, MD.
Coordinating Center Models Project: A Study of Coordinating Centers in Multicenter Clinical Trials. I. Design and Methods. Part 1.
Interim rept.
1 Mar 79, 171p
Contract N01-HV-62957
See also Part 2, PB82-143744.

The Coordinating Center Models Project (CCMP) is a three-year, contract-supported project sponsored by the National Heart, Lung, and Blood Institute (NHLBI). The NHLBI sponsors a number of large multi-center clinical trials, each of which includes in its organization a coordinating center with responsibility for receiving, processing, and storing accumulating study data and performing other coordination functions. Multicenter clinical trials are complex operations expensive to design and carry out. Consequently, the functions of the coordinating center are also complex. Coordinating centers and project offices of ten multicenter clinical trials, all sponsored by institutes of the National Institutes of Health, have participated in the data collection activities and the development and review of suggestions and recommendations emanating from the CCMP. A series of reports from the CCMP is in preparation. This first report deals with the design and methods of the project.

PB82-143744 PC **A08**/MF **A01**

Coordinating Center Models Project, Baltimore, MD.
Coordinating Center Models Project: A Study of Coordinating Centers in Multicenter Clinical Trials. I. Design and Methods. Part 2.
Interim rept.
1 Mar 79, 171p
Contract N01-HV-62957
See also Part 1, PB82-143736.

The Coordinating Center Models Project (CCMP) was a three-year, contract-supported project sponsored by the National Heart, Lung, and Blood Institute (NHLBI). The NHLBI sponsors a number of large multicenter clinical trials, each of which includes in its organization a coordinating center with responsibility for receiving, processing, and storing accumulating study data and performing other coordination functions. Multicenter clinical trials are complex operations expensive to design and carry out. Consequently, the functions of the coordinating center are also complex.

PB82-143751 PC **A04**/MF **A01**

Coordinating Center Models Project, Baltimore, MD.
Coordinating Center Models Project: A Study of Coordinating Centers in Multicenter Clinical Trials. VI. Phases of a Multicenter Clinical Trial.
Interim rept.
1 Sep 79, 57p
Contract N01-HV-62957

Long term multicenter clinical trials involve a wide array of activities which change in focus and order of importance as the trial proceeds from beginning to end. This report contains characterizations of six phases of activity: initial design, protocol development and implementation, patient recruitment, treatment and follow-up, patient closeout, and termination; together these phases cover the entire time course of the trial from inception to completion. Appendices include listings of activities in each of these phases for the trial group as a whole and for the coordinating center in particular. Major problems particularly for the coordinating center, can arise from the separation of responsibilities in the trial phase and from overlap of activities from phase to phase. This paper includes a discussion of these problems and possible ways in which they may be avoided or minimized.

PB82-145715 PC **E03**/MF **E03**

Radcliffe Science Library (England).
Network Structured Database Design for the Management of Serials,
C. Kalus. Oct 78, 27p RSL/ENG-673/1

The Radcliffe Science Library serves the Science Departments of the University of Oxford. In addition to the RSL (Radcliffe Science Library) there are approximately fifty specialized departmental libraries. The RSL Catalogue and Union List detail the holdings of the RSL and of the departmental libraries. The RSL is not able to manage its serials as efficiently as it wishes to, largely due to limits on its finance; hence it wants to discover whether a computerized system could increase its efficiency while maintaining its costs within acceptable limits. This research project is aimed specifically at the data handling requirements of such a system, as the suggestion had been made that a commercially available database package might be suitable for the proposed library system. The chief components of serials management at the RSL are: ordering, registration of parts as they arrive, claiming of parts which do not arrive, cataloguing, binding, and general financial management. The computerized system should be designed in such a way that the departmental libraries will be able to use it to manage their own serials.

PB82-145723 PC **A02**/MF **A01**

Radcliffe Science Library (England).
An Investigation of the Costs and Benefits of On-Line Serials Handling,
Dennis Shaw. 1980, 15p RSL/ENG-673/8

This investigation has been designed to establish the costs and benefits of an optimized on-line serials handling system and to compare these with an existing manual system. The study has been separated into five stages as follows: (1) a systems analysis of the existing manual operations, covering a collection of about 10,000 active titles; (2) an analysis of the costs inherent in operating the manual system; (3) the design, programming and implementation of an optimized on-line system; (4) the enumeration of the benefits and disadvantages of this automated system; and (5) an assessment of performance and evaluation of the costs of automation.

PB82-146200 PC **A04**/MF **A01**

Greater Egypt Regional Planning and Development Commission, Carbondale, IL.

Regional Directory: Public Officials.
Aug 81, 66p GERPDC-81-599
Sponsored in part by Economic Development Administration, Chicago, IL. Midwestern Region, and Illinois Dept. of Commerce and Community Affairs, Springfield.

The purpose of the directory is threefold: to further the planning process by identifying and cataloging the local public resources available in the five-county Region; to assist communication between and among public and private groups; and to indicate the range and extent of governing bodies in the Region.

PB82-148354 PC **A03**/MF **A01**
British Library, London (England). Research and Development Dept.
Publications, Documentation and Means for Their Dissemination in the Commission of the European Communities,
M. Hopkins. c1981, 43p BLR/D-5618, ISBN-0-905984-69-2
Also pub. as ISSN-0308-2385.

The report is based on discussions conducted with officials from the Commission of the European Communities during a study visit to Brussels in November 1979. British membership of the European Communities has added a new dimension to the national legislative process and has generated a fresh body of legislative and associated documentation. It has also provided librarians with a new series of challenges. The study visit was conceived as a fact-finding exercise to gather basic information about the internal structure of the Community's publishing program and documentation system. Consequently, the report contains separate chapters on Community publications policy, on the nature and characteristics of Commission documents (as distinct from publications) and on the range of automated information-retrieval services offered to members of staff within the Commission. The report also contains a chapter on European Documentation Centers and Depository Libraries. (Copyright (c) The British Library Board, 1981.)

PB82-148669 PC **A09**/MF **A01**
Department of Transportation, Washington, DC. Office of the Secretary.
Transportation Energy Activities of the U.S. Department of Transportation, 2nd Edition: A Technical Assistance Directory of Programs, Projects, and Contacts.
Feb 81, 177p DOT-I-81-10

This expanded directory is an updated summary of DOT sponsored energy related research, technical assistance, planning activities and information sources. Included are points of contact throughout the department of the regions for direct assistance, as well as an in-depth bibliography on energy issues of contingency planning, conservation, ridesharing, rail, bicycle, and other topics.

PB82-149451 PC **A05**/MF **A01**
British Library, London (England). Research and Development Dept.
Access to Local-Government Documentation.
c1981, 91p BLRD/5619, ISBN-0-905984-68-4
Also pub. as ISSN-0308-2385.

The project had its origins in the problems encountered by librarians and others who require access to the increasing number and range of documents produced by local authorities in the United Kingdom, especially in the past ten years. The project team set out to identify the total documentary output of all departments in a group of five selected local authorities. It also attempted to discover how such documentation, once identified, could be acquired. To these ends, it was necessary to examine in detail the types of document being produced to establish what, if any, bibliographic standards were being applied. The study also assessed, where possible, attitudes to publication and the procedures established by the local authorities to provide access to the documents produced. The final objective was to measure the general availability of the documents in local public libraries, national libraries and databases, and current-awareness services aimed at local government. The report describes the work program and analyzes the information collected.

PB82-149576 PC **A05**/MF **A01**
British Library, London (England). Research and Development Dept.
Inter-Library Comparisons: Pilot Comparison with Public Libraries.
c1981, 97p BLR/D-5638, ISBN-0-905984-74-
Also pub. as ISSN-0309-2385.

The report gives the results of an inter-library comparison with public libraries, as they were presented to the participants. The comparison was conducted on a pilot basis with library systems from the various types of library authorities througout Great Britain. It sets out the objectives of inter-library comparisons; describes the background to the comparison; outlines the way the comparison was conducted and the principles underlying its design; describes the tables of results and how they are used; and indicate some future action. It includes the tables of results, which contain the full individual figures for each library system and the figures for the averages and ranges of results. (Copyright (c) The British Library Board, 1981.)

PB82-149584 PC **A05**/MF **A01**
British Library, London (England). Research and Development Dept.
On-Line Information in Public Libraries: A Review of Recent British Research,
Nick Moore. c1981, 79p BLR/D-5648, ISBN-0-905984-76-5
Also pub. as ISSN-0308-2385.

The report has been prepared to provide background information to participants at the International Conference on On-line Information Services in Public Libraries. It contains descriptions of all the British Library Research and Development Department-supported research projects which have explored the introduction and use of on-line services, including Prestel, in public libraries. The report also contains a bibliography. (Copyright (c) The British Library Board, 1981.)

PB82-149592 PC **A07**/MF **A01**
British Library, London (England). Research and Development Dept.
The Teaching of Online Cataloguing and Searching and the Use of New Technology in U.K. Schools of Librarianship and Information Science,
Lucy A. Tedd. c1981, 136p BLR/D-5616, ISBN-0-905984-67-6
Also pub. as ISSN-0308-2385.

In late 1979 the 16 schools of librarianship and information science in the U.K. were surveyed on their teaching of online cataloguing and searching as well as their use of new technology, such as microcomputer systems, intelligent terminals, view-data systems and so on. The results are described in this report along with details of work in this area funded by the British Library Research and Development Department in seven of the schools. The final chapter of the report includes recommendations for further work in this area. (Copyright (c) The British Library Board, 1981.)

PB82-149600 PC **A04**/MF **A01**
British Library, London (England). Research and Development Dept.
A Selected List of Newsletters in the Field of Librarianship and Information Science,
J. R. Sharp, and M. Mann. c1981, 64p BLR/D-5630, ISBN-0-905984-72-2
Also pub. as ISSN-0308-2385.

The report consists of an introduction followed by a select annotated alphabetical list of newsletters in the field of librarianship and information science. (Copyright (c) The British Library Board, 1981.)

PB82-149626 PC **A05**/MF **A01**
British Library, London (England). Research and Development Dept.
A Directory of Information Resources in Biology in the UK,
H. V. Wyatt. c1981, 98p BLR/D-5606, ISBN-0-905984-65-X
Also pub. as ISSN-0308-2385.

The directory is an alphabetical listing of 77 libraries in the UK. The libraries include government departments, museums, research organizations and institutes, private societies, and universities. The index contains over 80 searching terms: 'historical collections', for example, gives access to 39 entries, subdivided into botany, agriculture and horticulture, food, medical, and zoology. Each library entry includes the following: the scope of the collection; date of earliest material; date of start of main collection; number of books and reprints; special collections; herbaria collections; reference collections (e.g. sera); culture collections; world reference center; maps and charts; fauna, etc. lists; computer or other searchable data bases; bibliographies; historical collections; slide painting and portrait collections; and current journal titles. This listing should be useful to all libraries and biology teaching and research departments. (Copyright (c) The British Library Board, 1981.)

PB82-149634 PC **A04**/MF **A01**
British Library, London (England). Research and Development Dept.
Library and Information Services for the Legal Profession,
C. Miskin. c1981, 74p BLR/D-5633, ISBN-0-905984-73-0
Also pub. as ISSN-0308-2385.

The report attempts to provide a brief survey of the library and information services available, in England, for the legal profession. It includes an explanation of the nature of the legal data base which needs to be exploited fully by both lawyers and law librarians so that they can perform their functions adequately. Brief descriptions of the education, organization, and training of both lawyers and law librarians are given. Details of the various types of law library and information unit available to lawyers form the bulk of the report. These details include bookstock, staffing and services. An outline is given of the different computerized legal information retrieval systems not available. The report concludes with a survey of the few user studies which have been carried out in this field. Suggestions are given for areas of future research. (Copyright (c) The British Library Board, 1981.)

PB82-149642 PC **A13**/MF **A01**
British Library, London (England). Research and Development Dept.
The Travelling Workshops Experiment in Library User Education,
D. Clark, C. G. S. Harris, P. J. Taylor, A. Douglas, and S. M. J. Lacey. c1981, 277p BLR/D-5602, ISBN-0-905984-63-3
Also pub. as ISSN-0308-2385.

The Travelling Workshops Experiment (TWE) was a four-year project to promote and demonstrate library-user education in British institutions of higher education. For the first two years the project team travelled out to institutions to conduct workshops on library use of students of biology, mechanical engineering and social welfare. In the final two years the learning materials developed for use in these workshops were made available, as packages, for librarians and lecturers to use themselves. Additional packages were prepared dealing with information sources in British history and health studies. The TWE was subject to an independent assessment undertaken by Aslib; this report incorporates the findings of that independent assessment. (Copyright (c) The British Library Board, 1981.)

PB82-149659 PC **A05**/MF **A01**
British Library, London (England). Research and Development Dept.
Library Manpower Planning: A Bibliographical Review,
Margaret Mann. c1981, 84p BLR/D-5614, ISBN-0-905984-66-8
Also pub. as ISSN-0308-2385.

The purpose of this review, compiled in the latter part of 1979 and early 1980, was to survey the work done in library manpower planning over the past thirty years and to provide a selection of useful references for anyone interested in the subject. At the end of the review there is an attempt to sum up the present situation in library manpower planning, and to suggest what developments might take place in the future. (Copyright (c) The British Library Board, 1981.)

PB82-149667 PC **A08**/MF **A01**
British Library, London (England). Research and Development Dept.
A Manual for the Investigation of Local Government Information Needs,
C. Mullings,, G. M. Francis, and T. D. Wilson. c1981, 170p BLR/D-5585, ISBN-0-905984-61-7
Also pub. as ISSN-0308-2385.

This manual is directed chiefly at those responsible for offering information services in local government who wish to know more about the needs of their users.

However, it contains much information and advice of relevance to anyone interested in information needs. Following general instructions on the way the investigation should be conducted, the manual has three chief sections: on the development and testing of the interview schedule and questionnaire; on the use of these instruments; and on the analysis of the resulting data. In this latter section, detailed advice is given on the use of the Statistical Package for the Social Sciences. The manual concludes with a report of an independent test of the questionnaire in a study of the information needs of the London Fire Brigade. (Copyright (c) The British Library Board, 1981.)

PB82-150343 PC **E03**/MF **A01**
British Library, London (England). Research and Development Dept.
Information and the Practice of Medicine: Report of the Medical Information Review Panel,
P. E. Cockerill. c1981, 51p 5605, ISBN-0-905984-64-1
Includes one sheet of 24X redution microfiche. Also pub. as ISSN-0308-2385.

The Medical Information Review Panel consisted of a group of doctors, established and supported for two years by the British Library Research and Development Department. It met six times and set up two working parties which met three times each. In order to provide the Department with information on which to base its program of research in medical information, the Review Panel discussed gaps and overlaps in information provision for doctors, factors affecting the use and non-use of information, whether material for doctors in various branches in medicine was provided in the right format and the right place, and whether information services were reaching those most in need. The report reviews the Panel's discussions and conclusions, and make recommendations. Topics discussed are grouped together in chapters on the profession's information needs, medical libraries, drug information services, continuing medical education, ways of stimulating information use by doctors and the application of new technology to medical information. A summary draws some conclusions and all recommendations, whether for research or action, are listed separately. (Copyright (c) The British Library Board, 1981.)

PB82-803610 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
On-Line Information Retrieval Systems. 1977-December, 1981 (Citations from the NTIS Data Base).
Jan 82, 331p
Supersedes PB80-814841, and NTIS/PS-79/0971. See also 1964-1976, NTIS/PS-78/0978.

On-line computer systems for retrieval of information are described in the reports cited. Systems development, formats of large and small systems, instructions for use and comparisons of operating networks are included. (This updated bibliography contains 324 citations, 131 of which are new entries to the previous edition.)

UCID-18843 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Feature Analysis of Relational Concepts, Languages and Systems for NOMAD/Sup TM/ and NOMAD2/Sup TM/.
D. R. Ries. Oct 80, 29p
Contract W-7405-ENG-48

NOMAD was developed to provide users of timesharing services with a data base management system. The system is independent of any particular class of systems, and is suitable for an extremely wide variety of applications. There are no inherent limitations on the total size of the applications except the machine limitations on the system on which NOMAD is running. Specifications are given with respect to data base constituents; functional capabilities; definition, generation and administration facilities; interfaces and DBMS architecture; operational aspects; and essentially relational solutions for generalized DBMS problems. Widespread use of NOMAD is sketched. (ERA citation 06:005642)

5C. Economics

AD-A108 450/8 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Accounting and Financial Management Div.
Millions in Losses Continue on Defense Stock Fund Sales to Foreign Customers.
10 Sep 81, 25p Rept no. GAO/AFMD-81-62
Report to the United States Senate.

The Department of Defense continues to sell items to foreign customers from its stock fund inventory for less than estimated replacement cost. As a result, Defense appropriations are subsidizing foreign sales by millions of dollars each year--a practice the Congress wants Defense to avoid. This report discusses pricing problems similar to those reported by GAO in 1978. In establishing sales prices, Defense does not: (1) adequately consider the impact of inflation in determining replacement costs; and (2) update often enough the sales prices charged foreign customers. GAO is recommending actions necessary to improve Defense's pricing policies and procedures for stock fund items sold from inventory. (Author)

AD-A108 451/6 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Accounting and Financial Management Div.
Defense Continues to Subsidize Sales of Secondary Items to Foreign Governments Because of Poor Pricing Policies.
5 Oct 81, 27p Rept no. GAO/AFMD-81-105
Report to the United States Senate.

Over the years, the Congress has made it clear that Defense appropriations are not to be used to subsidize the foreign sales program. However, according to GAO estimates, over $8 million of Defense appropriations were used to subsidize the foreign military sales program in fiscal 1979 at four inventory control points because of inadequacies in estimating replacement costs of secondary items sold from inventory. GAO believes that additional millions of dollars in subsidies occurred because all foreign governments were not billed for certain indirect costs associated with these sales. GAO is recommending actions, including legislative changes, necessary to improve Defense's pricing policies and procedures for sales of secondary items. (Author)

AD-A108 480/5 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
The Impact of Antitrust Enforcement on the Country's Minerals Posture.
7 Oct 81, 34p Rept no. GAO/EMD-82-11
Report to the Honorable James D. Santini, Chairman, Subcommittee on Mines and Mining, Committee on Interior and Insular Affairs, House of Representatives.

Increasing concern has been expressed about the ability of the U.S. minerals industries to develop, process, and obtain continuous access to minerals needed to satisfy the Nation's industrial requirements. In response to this concern a bill was introduced into the House proposing the creation of an executive branch Council on Minerals and Materials and several other measures that would help to establish a national minerals policy. Title VIII of the bill would require the Attorney General to review the U.S. antitrust laws, rules, and regulations to determine their effect on the productivity and profitability of the domestic mining and minerals industries. This title addresses the views of some critics that U.S. antitrust policy has at times been counterproductive, has been too concerned with domestic market concentration, and has reduced the ability of the U.S. minerals industries to achieve adequate economies of scale or to take advantage of other cooperative arrangements that would allow them to better compete with overseas competitors.

AD-A108 532/3 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Expanding the Efficiency Review Program for Commercial Activities Can Save Millions.
30 Sep 81, 4p Rept no. GAO/FPCD-81-77

Our objective was to determine if and how DOD could expand its efficiency review program to include those commercial activities now exempt. Because a large number of activities are exempt, the potential for increased efficiency and large dollar savings is significant. Office of Management and Budget (OMB) Circular A-76 establishes executive branch policies and procedures to be used to determine whether needed commercial or industrial goods and services should be obtained by contract with private sources or provided in-house using Government facilities and personnel. During July 1981, we interviewed officials responsible for the A-76 program in the Office of Federal Procurement Policy in OMB and the Office of the Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics. We also interviewed Army, Navy, and Air Force officials responsible for monitoring A-76 implementation. Much of the information used during this survey was initially collected for our June 19, 1981, report 'Civil Servants and Contract Employees: Who Should Do What for the Federal Government.' (FPCD-81-43). DOD officials provided data on estimated personnel savings resulting from the efficiency review program. We did not verify the accuracy of these DOD reported savings.

AD-A108 535/6 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Costs and Financial Risks of Certain Liquefied Natural Gas Import Projects to U.S. Taxpayers and Gas Consumers.
19 Oct 81, 13p Rept no. GAO/EMD-82-12
Report to the Honorable John D. Dingell Chairman, Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives.

Both the Export-Import Bank and the Maritime Administration provided financial assistance for LNG projects. However, their involvement was not directly related to the U.S. importation of Algerian natural gas. The Export-Import Bank provided loans and loan guarantees to Sonatrach, the Algerian national oil and gas company, to facilitate Sonatrach's use of U.S. contractors and equipment in the construction of LNG facilities and thereby promote American exports. The Maritime Administration, in line with its mandate to encourage the growth and maintenance of the U.S. merchant marine and shipbuilding industry, provided the U.S. shipbuilders and shipowners with construction subsidies and loan guarantees to ensure the construction of ships in the United States. U.S. owners of LNG facilities and ships are not entitled to any special energy tax credits. They qualify, however, for the standard investment tax credit available to anyone who invests in certain depreciable property. Based on discussions with officials from each of the companies involved, we estimate about $161 million of investment credit has been or will be claimed, subject to audit by the Internal Revenue Service.

AD-A108 546/3 PC **A06**/MF **A01**
General Accounting Office, Washington, DC. General Government Div.
IRS Could Better Protect U.S. Tax Interests in Determining the Income of Multinational Corporations.
30 Sep 81, 111p Rept no. GAO/GGD-81-81
Report to the Chairman House Committee on Ways and Means.

When multinational corporations price transactions with their subsidiaries, they often have the opportunity to take advantage of disparate corporate tax rates by shifting income. Ideally, such prices are adjusted by IRS under Code Section 482 to those for similar transactions between unrelated parties--the so-called 'arms's length standard.' However, IRS often has difficulty identifying a true arm's length price on which to base adjustments. In its review of current IRS examination data on 519 U.S. multinationals, each having assets over $250 million and having engaged in transactions with its foreign subsidiaries, GAO found that only 3 percent (12 of 403) of IRS' total recommended section 482 adjustments to reported income were based on a true arm's length price. The remaining adjustments were based on estimated prices constructed by IRS using complex guidelines prescribed by the Department of the Treasury--guidelines which have caused administrative burden and uncertainty both for IRS and taxpayers. The number and volume of complex international intercorporate transactions as well as the amounts of income involved continue to grow.

AD-A108 600/8 PC **A08**/MF **A01**
Center for Planning and Research, Inc., Palo Alto, CA.
Expedient Measures in Postattack Industrial Recovery: Petroleum Refining.
Final rept. 12 Sep 79-1 Dec 80,

Carl F. Miller, and S. Duane Stratton. 1 Dec 80, 158p DNA-5602F
Contract DNA001-79-C-0408

Definitions, assumptions, and needs for procedures and facilities for the rapid recovery of the United States, petroleum-based fuel industry in a nuclear, postattack environment are explained. Principal components of a typical refinery and two versions of an expedient crude oil unit (ECOU) are identified, along with their damage levels incurred with respect to nuclear blast, static overpressures. Repair or reconstruction efforts and schedules for primarily recovery essential diesel fuel are compared between the typical refinery and the ECOU versions. Expedient, preattack component hardening, critical components requiring stockpiling consideration, and component substitutions for ECOU construction are briefly discussed. Recommendations to evaluate infrastructural and other damage mechanism influences on the expedient recovery concept and to expand that concept to other essential industrial sectors in the United States are offered. (Author)

AD-A108 640/4 PC **A13**/MF **A01**
Air Force Systems Command, Washington, DC.
Catalog of Canadian Industrial Capabilities.
1st edition,
Robert L. McKenney, Jr., and James G. Espey, III.
Sep 81, 285p Rept no. AFSC-TR-81-49

This catalog is a contracting source list of Canadian industries designed to be used by USAF procurement offices and project engineers/scientists. It provides profiles, a company/capability key word cross reference index and contact points for each company.

AD-A108 722/0 PC **A02**/MF **A01**
Logistics Management Inst., Washington, DC.
Contract Financing for Small Business.
Final rept.,
Paul R. McClenon. Nov 81, 13p Rept no. LMI-RE102
Contract MDA903-81-C-0166

The DoD is trying to increase the number and volume of contracts it awards to small businesses. To enhance prospects, it wants to assure that small businesses are not disadvantaged by its contract financing procedures. DoD policies and practices for evaluating financial capability are effective. Reimbursements are prompt in the vast majority of cases. On fixed-price contracts exceeding four months to first delivery, progress payments shift most of the burden of financing operating capital to the Government. The program is vital and effective. (Author)

HRP-0903851/4 PC **A02**/MF **A01**
Alpha Center for Health Planning, Bethesda, MD.
Competition in the Health Care Field.
5 Nov 81, 22p TECHNICAL ASSISTANCE MEMO-48
Contract PHS-HRA-232-79-0035

The following areas are reviewed in this memorandum: evolution of health care markets and government regulation; competition and its limits; how agencies have responded to the mandate to promote competition; a guide to assessing markets; and problems agencies experience in responding to this new mandate.

ITA-82-01-501 PC**$15.00**/MF **A01**
International Trade Administration, Washington, DC.
India Market Research Report on Industrial Process Controls,
R. K. Kapoor, and V. Rangaraj. Oct 81, 75p

This report contains international marketing information that may be of interest to potential exporters seeking such information in their respective areas of interest.

PB82-106964 MF **A01**
Bureau of Labor Statistics, Washington, DC.
Employment and Wages Annual Average 1978,
Michael Searson, and Rosalie Epstein. 1982, 111p BLS/EW/AR-78
See also PB81-146037.
Microfiche copies only.

Data in this report represent the complete count of workers and their wages in employment covered by unemployment programs during 1978, annual averages. The data are collected and organized by industry, and State, by the State employment security agencies from reports filed by employers. The Bureau of Labor Statistics compiles the data on a nationwide basis, by State and industry.

PB82-129172 CP **T02**
Department of Energy, Washington, DC. Energy Information Administration.
Form 1 Statistics of Privately Owned Electric Utilities (1980).
Data file,
Samuel E. Brown, and John G. Colligan. 1980, mag tape DOE/DF-81/039
Supersedes Rept. no. DOE/DF-81/006, PB81-184897.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

This report, issued annually since 1938, presents comprehensive financial and operating information on all the large privately-owned utility companies in the United States, District of Columbia, and Puerto Rico. Data are tabulated from annual reports filed with the Federal Energy Regulatory Commission by 192 Classes A and B utilities. Class A utilities are those having annual electric operating revenues of $2.5 million or more. Class B utilities are those with annual electric operating revenues of $1 million or more, but less than $2.5 million. The Class A and B utilities listed in this report comprise nearly 100% of the privately-owned sector of the electric light and power industry. Data include: (1) financial and operational balance sheets; (2) income and retained earnings statements; (3) statements of changes in financial position; (4) capital stock and long-term debt; (5) electric operating revenues, customers, and sales by classes of service; (6) electric operation and maintenance expenses; (7) data per type of utility plant; (8) physical quantities (capacity by type of utility plant; (9) rates of return on electric utility rate base and rates return on common equity; (10) schedule of investment tax credits generated and utiized (since 1962); (11) research, development, and demonstration (for the three most recent years); (12) sales expense, customer service and information expense, and general advertising expense; (13) environmental protection facilities and expenses.

PB82-137290 PC **A09**/MF **A01**
Council of State Planning Agencies, Washington, DC.
Inflation and Unemployment: Surviving the 1980s,
Roger J. Vaughan. c1979, 176p ISBN-0-93482-04-3, NSF/RA-790747
Grant NSF-ISP79-10951
Library of Congress catalog card no. 79-67383.

This volume details appropriate Federal, state, and local government roles and policies for fighting inflation by examining what these parties can do to combat recession. The goal of price stability and the causes of inflation and its impacts are analyzed. A distinction is made between the goal of 'whipping' inflation which is a Federal responsibility and the goal of ameliorating the harm done by inflation, which is both a Federal and state responsibility. The failure of a Federal monetary policy to stabilize prices is discussed. How states can help avoid the harmful effects of inflation through cost cutting, regulation review, and tax reform is outlined. The goal of economic stability is discussed. Three components are identified: absorbing excess productive capacity; providing jobs for the unemployed; and maintaining public services in the face of declining revenues. The failure of Federal efforts to meet these objectives because of poor timing, poor targeting, and an overall lack of job creation is described. A plan is presented on how states can moderate the business cycle by setting up stabilization funds from Federal, state, and local sources during expansionary years and use them during recessions.

PB82-142415 PC **A02**/MF **A01**
Bureau of Economic Analysis, Washington, DC.
Employment and Employee Compensation in the 1972 Input-Output Study.
Staff paper,
Jane-Ring F. Crane. Oct 81, 25p BEA-SP-81-038
See also PB-278 759.

The report provides 1972 employment, employee compensation, and wages and salaries for all employees and employment, worker hours, and wages for production workers by industries as defined for the 1972 input-output table.

PB82-146093 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Magazine of International Trade, Volume 4, Number 26, December 28, 1981.
Biweekly pub.
28 Dec 81, 32p
See also Volume 4, Number 16, PB81-239444, and Volume 4, Number 10, PB81-203242.
Paper copy available from Supt. of Docs.

This issue features an index of articles that appeared in all 26 issues published during 1981 (Volume 4). The material is indexed by subject, country, and in some instances by product or service. The index is designed to serve as a useful tool for readers. The magazine also features basic data on U.S. international trade--statistical information contained in six tables shows the current international trade position of the United States. The geographical checklist of ITA publications is an updated checklist consisting of seven series of international business publications produced by the International Trade Administration: Foreign Economic Trends, Overseas Business Reports, Global Market Surveys, Country Market Sectoral Surveys, International Economic Indicators, Current Price Developments in the U.S. and Major Foreign Countries, and Market Share Reports.

PB82-146127 PC **A06**/MF **A01**
Trans-World Marketing Associates, Inc., Washington, DC.
Patterns of Discrimination Under Collective Motor Carrier Ratemaking System.
Final rept.,
Thomas M. Corsi, and Merrill J. Roberts. Aug 81, 107p DOT-P-81-91
Contract DOTS-59-81-C-00112

The study identifies and catalogues the types of discrimination associated with collective pricing by trucking rate bureaus under their antitrust immunity. One hundred cases are cited which involve higher freight charges for some shipments that are not justified by higher costs. This economic discrimination does not necessarily violate statutory prohibitions which are directed against only 'unjust' or 'undue' discrimination or prejudice. The examples were drawn from a variety of sources, including recent Investigation and Suspension Docket files of the ICC, submission of parties in several major ICC Ex Parte investigations, rate studies covering the Rocky Mountain and New England regions, and traffic consultants specializing in rate problems.

PB82-147356 PC **A05**/MF **A01**
Agricultural Cooperative Service, Washington, DC.
Export Marketing Guide for Cooperatives,
Donald E. Hirsch. Mar 77, 88p ACS/MRR-1074

Agricultural exports from the United States exceed agricultural imports by about $12 billion annually. This favorable balance in agricultural trade means many thousands of jobs in industry, higher net incomes for farmers, and better living for most Americans. Farmer cooperatives play an important role in the export marketing of many agricultural commodities. They are relatively unimportant for others. The basic objective of this report is to provide technical information that will assist additional farmer cooperative leaders to gain the understanding and expertise needed to export successfully.

PB82-147364 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for Policy Alternatives.
A Microeconomic Study on Productivity: Impact of OSHA Regulation on the Asbestos Industry.
Final rept. Sep 80-Nov 81,
W. Curtiss Priest, and Sohail Bengali. Nov 81, 182p CPA-81-26, ASPER/CON-80/0175/A
Contract DL-J-9-M-0-0175

This report examines how industrial productivity and technology has been affected by the 1972 OSHA asbestos regulation. The research effort focused on case studies of twenty-seven firms in the asbestos industry. Information was collected on compliance costs, technological change and R&D for asbestos substitutes. Sixteen firms provided sufficient quantitative data to perform productivity impact calculations. The variation in impacts were not very great and thus the authors could state with a 95% level of confidence that the average impact on firms working with loose asbestos was -2.9% and not less than -1.6% and not greater

than -4.2%. It was found that the asbestos industry had implemented major dust control measures well before the 1972 regulation. Most plants constructed after 1950 incorporated extensive ventilation and dust collection systems, and existing plants were generally retrofitted with such equipment by 1960. The annual reduction in productivity due to regulation in the economic activity associated with asbestos is about .7%. The impact on the national economy of the regulation is about -.0009%. The highest impact on the firms sampled was -10%.

PB82-148214 PC **A10**/MF **A01**
Department of the Treasury, Washington, DC.
Contingent Foreign Liabilities of the United States Government.
30 Jun 81, 204p
See also PB82-118837.

The report presents tables for all foreign obligors; component obligor divisions of official and private obligors. Other tables list details of individual contracts for more than one million dollars by program within country and the Defense Security Assistance Agency's contingent liability to the Federal Financing Bank.

PB82-148222 PC **A05**/MF **A01**
Department of the Treasury, Washington, DC.
Significant Arrearages Due the United States Government and Unpaid 90 Days or More by Official Foreign Obligors.
30 Jun 81, 88p

These tables present a record as of June 30, 1981, of the foreign indebtedness to the United States Government with principal emphasis on Amounts Due and Unpaid 90 Days or More by Official Foreign Obligors.

PB82-148230 PC **A08**/MF **A01**
Department of the Treasury, Washington, DC.
Amounts Due and Unpaid 90 Days or More on Foreign Credits of the United States Government.
30 Jun 81, 169p

These tables present a record as of June 30, 1981, of the foreign indebtedness to the United States Government with principal emphasis on 'Amounts Due and Unpaid 90 Days or More'. Tables on short-term loans and credits and on accounts receivable show also the amounts disbursed and still outstanding.

PB82-148248 PC **A14**/MF **A01**
Department of the Treasury, Washington, DC.
Status of Active Foreign Credits of the United States Government.
30 Jun 81, 323p

The report contains the status of foreign-assistance related agreements of contractual indebtedness to the United States Government. It includes accounts receivable from foreigners and active short-term and long-term loans and credits to foreigners. It covers active loans and credits since July 1, 1941 as well as foreign currency transactions.

PB82-149329 PC **A03**/MF **A01**
Massachusetts Univ., Amherst.
National Health Insurance and Small Business: A Preliminary Analysis.
Final rept.,
Peter Dorman. 29 Dec 81, 27p
Sponsored in part by Small Business Administration, Washington, DC.

The purpose of this study is to determine whether any mandatory health insurance system organized through the workplace will place an added disproportionate burden on small employers. The research will seek to identify current drawbacks to small business participation in private group health systems and analyze legislative instruments which will mitigate or reinforce these drawbacks.

PB82-153495 PC **A08**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Domestic Gas Water Heater Market Assessment.
Final rept. Nov 80-May 81,
J. M. Torrey, D. L. Peterka, and R. C. Erickson. Nov 81, 166p SAI-444-81-203-LJ, GRI-80/0089
Contract GRI-5080-310-0365

The market impact of energy efficiency improvement design concepts for residential gas water heaters was evaluated in this study. Several advanced water heater concepts were examined; the forced-draft and power-burner concepts had the most attractive combination of efficiency and low incremental first cost. The following items relating to the efficiency improvements were examined: possible annual natural gas savings; economic factors of payback period and change in life cycle cost; durability and serviceability; utility and consumer appeal; legal and marketplace barriers; past or current related work.

PB82-860594 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Peak-load Pricing. 1976-January, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Jan 82.
Jan 82, 330p
Supersedes PB81-856635.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography covers electric utilities' peak-load pricing policies, methods, apparatus, and their socio-economic impacts upon residential, commercial, and industrial electric power consumption. Analyses of general concepts and specific applications and experiences are presented along with considerations of advantages and disadvantages of time-of-use rates and studies of electric utility rate structure designs. (This updated bibliography contains 330 citations, 55 of which are new entries to the previous edition.)

PB82-860982 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Multifamily Residential Real Property Ownership and Investment. 1975-January, 1982 (Citations from the Management Contents Data Base).
Rept. for 1975-Jan 82.
Jan 82, 64p

Citations in this bibliography include reports describing advantages and disadvantages in community real estate associations. Apartment renting, and condominium, cooperative, and home ownership are contrasted and compared relative to such factors as initial costs, capital gain tax breaks, maintenance requirement responsibilities, income appreciation, liquidity, and future market trends. Condominium conversion profits, condominium time-sharing, retirement apartments in association with nursing home chains, and co-ownership project developments are among the topics discussed. (Contains 85 citations fully indexed and includes a title list.)

RAND/R-2508-DOE/DWP PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
British Industrial Response to the Peak-Load Pricing of Electricity.
J. P. Acton, E. H. Gelbard, J. R. Hosek, and D. J. McKay. Feb 80, 90p
Contract AC01-79PE70078

This report examines selected aspects of British industrial experience with peak-load pricing of electricity. Industrial users interviewed had had peak-load pricing in effect for more than 15 years. Industries represented included chemicals, industrial gases, cement manufacturing, pulp and paper, steel, and other miscellaneous industries. Together they represent about 35% of electricity purchases by British industrial customers. Some of the reasons for present US interest in the potential industrial response to time-of-use pricing and the rationale for looking to European experience for guidance are highlighted. Section II summarizes the principal features of electricity rate structures for industrial customers in England and Wales. Section III presents a brief description of the methodology and the results of interviews. The section is organized around 7 major industries which represent a number of generic processes found in the US and in other industrial economies. Section IV summarizes the principal findings for the 7 industries interviewed. (ERA citation 05:030776)

SERI/TR-8251-1 PC **A07**/MF **A01**
Science Applications, Inc., McLean, VA.
Characterization and Assessment of Potential European and Japanese Competition in Photovoltaics. Final Report.
Oct 79, 130p
Contract EG-77-C-01-4042

This study is an assessment of the potential of European and Japanese firms to produce and market photovoltaic (PV) power systems internationally in competition with firms in the United States. It consists of three distinct parts: (1) an overview of worldwide export activity which describes the general posture of selected European countries and Japan; (2) an assessment of European competition focusing on Germany, France, and the United Kingdom; and (3) an assessment of Japanese competition. All research was conducted within the United States relying on published reports in the scientific, trade, and business press; a firm's annual reports; and telephone interviews with representatives of European and Japanese firms. European and Japanese government representatives were also contacted and government-sponsored programs evaluated. European competition is addressed in three areas: characterization of the PV industry; current and potential marketing activity; and the status of PV and related technological developments. The same areas are addressed for depicting Japanese competition except that greater emphasis is placed on past industrial experience and related semiconductor sales. (ERA citation 05:008276)

5D. History, Law, and Political Science

AD-A108 283/3 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
The Burden of Soviet Defense: A Political-Economic Essay.
Interim rept.,
Abraham S. Becker. Oct 81, 96p Rept no. RAND/R-2752-AF
Contract F49620-82-C-0018

Two questions are posed: How can we explain the monotonic growth of the Soviet military budget over two decades when overall economic growth was slowing down. Can changes in this pattern be expected. Section II defines and analyzes the concept of the Soviet defense burden, then surveys empirical measures of the burden. Section III is skeptical about the extent to which the Soviet buildup is a response to external threats to security. The persistent buildup is seen instead to reflect the leadership's perception of national priorities and to be supported by a decision-making apparatus that maintains them. In the near future, external challenges (particularly the U.S. buildup) and opportunities will create pressures to maintain the pace of military spending, but worsening economic prospects will make it increasingly burdensome. Neither Brezhnev nor his successors are likely to have new options for dealing with this dilemma, and considerations that have induced the Politburo to try to 'middle through' will probably continue to dominate. U.S. policy has a significant capacity to influence Soviet policy in this direction.

AD-A108 301/3 PC **A09**/MF **A01**
Army Military Personnel Center, Alexandria, VA.
The Allies and the West German Parliamentary Council: The Crisis of April 1949.
Final rept.,
Phillip J. Linn. 8 Sep 81, 184p
Master's thesis.

The thesis examines the impact of personalities, issues, and events on the drafting of the West German Basic Law between July 1948 and May 1949. Special emphasis is given to the development and resolution of the crisis which erupted in the Council in April 1949, almost forcing its dissolution. Military and diplomatic records in the National Archives of the United States provided the primary sources of evidence, supplemented by British, American, and German memoirs and secondary works. The study provides new insights into the resolution of the April crisis, viewed from both the Allied and German perspective. Ultimately the U.S. desire to bring the Berlin Crisis to an end and the Allied concern to re-establish a strong Western Europe combined with a German willingness to accept the political realities in Europe to enable the process to be concluded successfully. (Author)

AD-A108 452/4 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. International Div.
AID and Universities Have Yet to Forge an Effective Partnership to Combat World Food Problems.
16 Oct 81, 51p Rept no. GAO/ID-82-3

Report to the Congress of the United States.

In 1975, the Congress under Title XII (sections 296-300) of the Foreign Assistance Act directed the Agency for International Development (AID) to improve and strengthen the involvement of U.S. land-grant and other eligible universities in solving food problems in developing countries. Progress in achieving this goal is slow. U.S. universities and AID have yet to forge the development partnership necessary to effectively reduce world hunger. Policy and management actions are needed to overcome attitudinal and institutional barriers which limit the potential benefits of such a partnership. The quality of technical assistance provided to developing countries can be improved if AID takes the actions recommended in this report. (Author)

AD-A108 651/1 PC **A08**/MF **A01**
Hudson Inst., Inc., Croton-on-Hudson, NY.
SALT: Deep Force Level Reductions.
Draft final rept. Aug 79-Sep 80,
Colin S. Gray, and Keith B. Payne. Mar 81, 164p HI-3195-RR, SBI-AD-E750 196
Contract DNA001-79-C-0392

This report examines the sense in, and likely feasibility of, deep reductions in SALT 3. The analysis stresses the interdependence that there should be between defense planning and arms control. Part 1 addresses Soviet and American strategic doctrinal issues, while Part 2 deals with the issues of strategic defense, theater nuclear forces, and verification. (author)

AD-A108 693/3 MF **A01**
American Univ., Washington, DC. Foreign Area Studies.
China: A Country Study.
Area handbook series, 3rd edition,
Frederica M. Bunge, and Rinn-Sup Shinn. Sep 80, 621p DA-PAM-550-60
Supersedes Rept. no. DA-PAM-550-60 dated 1972.
Availability: Superintendent of Documents, GPO, Washington, DC 20402, HC$12.00. Microfiche furnished to DTIC (and NTIS) users.

China: A Country Study supersedes the 1972 Area Handbook for the People's Republic of China. Because of the sweeping changes in the form and substance of many economic, social, and political institutions in the past decade, little material from the original volume has been incorporated in the present study. Sources of information used in the new edition have included scholarly journals and monographs, official reports of governments and international organizations, foreign and domestic newspapers, numerous periodicals, and interviews with individuals having special competence in Asian affairs. Chapter bibliographies calling attention to valuable sources of further reading appear at the end of each chapter. The aim of the authors was to enhance in some small measure the reader's understanding of the nature of contemporary Chinese culture and society against a backdrop of the past. In view of the limited access of Western scholars to the country since 1949 and the paucity of information from Chinese sources until very recently, however, statistical reporting and descriptive material in this text contain obvious lacunae, and the interpretations and conclusions of the authors must necessarily be regarded as highly tentative. Many questions remain for further exploration by interested observers of Chinese affairs.

5E. Human Factors Engineering

AD-A108 274/2 PC **A03**/MF **A01**
Douglas Aircraft Co., Long Beach, CA.
Aircrew Restraint and Mobility Test Fixture.
Final rept.,
A. Blair McDonald. Jul 81, 33p AFAMRL-TR-81-27
Contract F33615-79-C-0522

The next generation combat aircraft with advanced aerodynamic and control features will have combat maneuver capability which will impose multiaxial accelerations on the aircrew. Advanced aircrew systems will be required for restraint, support, and mobility during these combat conditions. New concepts for these systems have been defined, but tests under representative dynamic conditions are necessary to evaluate the effectiveness of these concepts when implemented. (Author)

AD-A108 277/5 PC **A05**/MF **A01**
Rockwell International, El Segundo, CA. North American Aircraft Div.
Multiple Ejection Effects Analysis.
Final rept. 8 May-30 Dec 80,
G. A. Freeman, and G. R. Casteel. Aug 81, 92p NA-80-545, AFAMRL-TR-80-140
Contract F33615-80-C-0519

Wind tunnel data for the ACES-B1 ejection seat in the presence of the B-1 forebody are documented and analyzed. Significant aerodynamic interactions exist at high speed between dual seats and between seat/forebody. Trajectory data are presented with and without the forebody effect upon the seat. The forebody flow field is shown to increase the human engineering/biomechanical problems during high-speed ejection. (Author)

AD-A108 606/5 PC **A02**/MF **A01**
National Research Council, Washington, DC. Committee on Human Factors.
Activities of the Committee on Human Factors: October 1, 1980 - September 30, 1981.
Annual summary rept.,
Robert T. Hennessy. 30 Nov 81, 22p
Contract N00014-81-C-0017

The Committee on Human Factors was established and held its first meeting in December 1980. The three principal accomplishments of the committee during the reporting period were: (a) identifying critical problems in human factors and formulating preliminary statements defining the nature of these problems and the basic research needed to alleviate these problems; (b) establishing membership and guidelines for a special working group on simulation; and (c) planning the conduct of a workshop on applied methodologies that will identify some methodologies suitable for presentation at a tutorial symposium and other methodologies deserving research support.

AD-A108 643/8 PC **A11**/MF **A01**
Boeing Aerospace Co., Seattle, WA. Engineering Technology Div.
Human Engineering Procedures Guide.
Final rept. 2 Apr-2 Dec 79,
Charles W. Geer. Sep 81, 245p D180-25471-1, AFAMRL-TR-81-35
Contract F33615-79-C-0520

Human Engineering (HE) procedures during the system acquisition process are presented for the assistance of various Air Force and industry personnel. The guide is divided into three parts. The first part of the guide is introductory material which scopes the effort and defines HE and human factors engineering (HFE). The second part provides guidance to Air Force and industry management. The third, and last, part is the largest section and it provides assistance to both Air Force and industry persons assigned direct responsibility for HE. The management portion shows current management aspects of the HE process utilizing directives, specifications, regulations, and pamphlets. HE activities are described in general terms of both what should be done and when it should be accomplished. The practical value of HE is discussed in the management section. Various HE program management relationships are suggested also, and the procedure for including HE in the total system effort is presented. The user's portion provides assistance in the areas of HE documentation and requirements that should apply to the program. Program analysis source data suggestions are provided. The planning and scheduling of HE activities are discussed. The required coordination between HE and other disciplines are presented along with the need for coordination with management. Other topics presented include: possible allocation of effort to consultants and/or subcontractors, preparation of the HE portion of the RFP, contractor proposal preparation, proposal evaluation, contractor task accomplishment, and contractor task monitoring. (Author)

AD-A108 688/3 PC **A02**/MF **A01**
Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
Physiological Acceptability Tests of the SJU-5/A Ejection Seat - Second Physiological Acceptance Demonstration.
Final rept.,
William C. Ward, Jr., and Kenneth L. Miller. 1 Jul 81, 23p Rept no. NADC-81215-60
See also AD-B040 858L.

This program was conducted to evaluate solutions to deficiencies of the F18 Aircraft Martin-Baker SJU-5/A escape system which had been identified during the initial Physiological Acceptability Demonstration (Report No. NADC-79040-60). The proposed solutions evaluated during this program included: incorporation of 'toe guides' on the rudder pedals, relocation of the head rest, modification of the back support, and incorporation of leg garters into the anti-'G' suit. Of these, the head rest and back support still require additional modification. Upon satisfactory correction of the head rest and back support deficiencies, physiological acceptance of the F18 escape system will be recommended for the pilot's station. (Author)

AD-A108 723/8 PC **A05**/MF **A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
High Mobility Driver Performance Analysis.
Final rept. 1979-1980,
Robert W. Bauer, and William D. Hahn. Jun 81, 94p Rept no. ARI-RR-1306

The Combat Vehicles Technology Program's High Mobility Agility (HIMAG) Vehicle Chassis Tests, conducted in 1978 and 1979, provided an opportunity to explore the prediction of human performance requirements and the implications of high mobility tracked vehicle design for driver performance. Preliminary analysis and projections, based upon the vehicle concept during construction, were compared with data gathered during driver training and 20 km testing. Results supported the general hypothesis that cross-country driving on the higher horsepower per ton vehicles was significantly different from the same task on the M60A1 or M113. Course speeds, driver throttle use, driver errors and critical incidents showed a differential pattern on HIMAG trials. Human factors and human engineering design deficiencies in the driver compartment, some of which were predicted in preliminary analysis and training but were not resolved, probably limited HIMAG speed and maneuver. (Author)

N82-13397/6 PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Testing of a Work Bench for Handling of Explosives in the Laboratory Test AV Arbetsbaenk Foer Hantering AV Explosivahemen Paa Laboratorier.
R. Hank, K. Johansson, and L. Lagman. Jan 81, 32p FOA-C-20393-D1
Text in Swedish.

A prototype work station was developed at which jobs can be carried out with explosives up to 10 gr and deflagrating products up to 50 gr. Tests were made to investigate the consequences of a spontaneous accident during work. Conclusions are: the workbench offers good protection against splinters provided the inside walls are coated with a shock absorber; the carbonate glass should be a minimum of eight mm thick; the risk of burns, except on arms and hands, is very low; the bench withstands the explosion with the given weight of explosives (10 gr); the risk of lesions on the lung are very low, for the operator as well as for somebody nearby.

N82-13726/6 PC **A03**/MF **A01**
Carl-Cranz-Gesellschaft e.V., Brunswick (Germany, F.R.).
Taxonomy of the Human Factors in Man Machine Systems Taxonomie der Humanfaktoren in Mensch-Maschine-Systemen.
K. Steininger. 1980, 30p
Text in German.

The human factors in man-machine systems are presented in a global model showing the manifold interplay between man, technical system and management. The psychic and social constraints involved are stressed. The nature of human error is also treated by means of a classification and the relation between work load and perceived stress is discussed. On the basis of these classifications, ergonometric methods and concepts for human factor engineering are derived and proposed for further investigations are formulated.

PB82-138702 PC **A07**/MF **A01**
Northeastern Univ., Boston, MA.

Comparison of Various Methods for Predicting the Loudness and Acceptability of Noise. Part II. Effects of Spectral Pattern and Tonal Components,
B. Scharf, and R. Hellman. Nov 79, 133p EPA-550/9-79-102
See also PB81-243826.

The present report is a continuation of an earlier report by Scharf, Hellman and Bauer (1977). The objectives are (1) to determine whether subjective judgments of particular types of noise, categorized by spectral shape, are better approximated by some descriptors (frequency weightings and calculation procedures) than by others, and (2) to investigate the role of tonal components in these studies and to assess the adequacy of several tone-correction procedures. The analysis of data by spectral shape produced a mixed outcome.

5F. Humanities

AD-A108 738/6 PC **A06**/MF **A01**
Tulsa Univ., OK. Lab. of Archaeology.
Tradition and Culture Change in the Oklahoma Delaware Big House Community: 1867-1924.
Contributions in archaeology no. 9,
Terry J. Prewitt. 1981, 101p
Contract DACW56-77-C-0228

During the period from June 1979 through May 1980 investigations were conducted on the cultural history of the Copan Lake area located on the drainage of the Little Caney River between its confluence with the Caney River and the town of Caney, Kansas. This report represents the ethnohistoric portion of the contracted work. This initial ethnohistoric investigation was designed to accomplish certain limited goals which included: (1) An assessment of published and unpublished literature, records, and archival material relating to the lake area; (2) An assessment of the introduction of agricultural systems into the projected area; and (3) An overview of historically known groups in the project area, and the settlement sequence of the historic groups.

PB82-149303 PC **A07**/MF **A01**
National Park Service, Tucson, AZ. Western Archeological Center.
Excavations at Tumacacori 1979/1980: Historic Archeology at Tumacacori National Monument, Arizona.
Final rept.,
C. Michael Barton, Kay Simpson, and Lee Fratt. Aug 81, 128p NPS/WAC-81/25, WAC/ANTHROPOLOGY-17

This report documents excavation conducted by Western Archeological and Conservation Center in the Campo Santo (cemetery), granary, and convento area of Tumacacori National Monument, Arizona, prior to a series of stabilization projects within the mission complex. A trench dug in the Campo Santo revealed a series of well-defined occupation levels from the early mission period. This area was found to be associated with secular functions and domestic activities, indicating that the Campo Santo originally may have been part of the Indian village rather than the mission complex. Two trenches in the granary were excavated exposing a complicated building sequence and an early room, badly disturbed, but possibly predating the convento. The cloister and 2 rooms of the south wing of the Franciscan convento were also excavated revealing cloister architectural features including the cloister bench, an unidentified adobe structure, and deposits predating the convento.

5H. Man-Machine Relations

AD-A108 509/1 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. School of Industrial Engineering.
Modeling Human Attention Allocation Strategies in Situations with Competing Criteria.
Final rept. Mar-Aug 81,
Thiruvenkatasamy Govindaraj. Oct 81, 22p AFOSR-TR-81-0785
Grant AFOSR-81-0144

In supervisory control situations involving multiple human operators, proper cooperation and coordination is essential. In addition to their individual tasks, the operators are jointly responsible for certain tasks. It is usually not clear when and who should take responsibility for the joint tasks. Proper scheduling of tasks and appropriate allocation of resources are necessary for optimal performance, and in some instances, for overall safety. Understanding how multiple operators interact requires the understanding of single operator performance. A model based on Pareto Optimality and Fuzzy Set theory was developed for the human operator. An experimental paradigm had been developed earlier to study the human monitor. The scenario used was similar to monitoring the spread of forest fires, and timely identification of threatening conditions. Experiments were conducted based on the paradigm. Results showed that the operators used updates to reduce the uncertainty to a sufficiently low level before starting threat classification. Sites where the probability of damage was close to 0.5 were more difficult to classify. Early decisions resulted in more errors. Heuristics proposed earlier appeared to be relevant. (Author)

AD-A108 724/6 PC **A02**/MF **A01**
Southeastern Center for Electrical Engineering Education, Inc., St. Cloud, FL.
Task Analytic Techniques: Application to the Design of a Flight Simulator Instructor/Operator Console.
Final rept.,
Charles D. Sanders. Dec 81, 21p AFHRL-TP-81-38
Contract F49620-79-C-0038

Instructional Systems Development (ISD) has contributed to the efficiency and low cost of air flight training through the medium of the simulator. Task analysis is a component of ISD, and its application to the improvement of devices such as simulator instructor/operator consoles will continue to enhance the quality of flight training. Task analytic techniques are inextricably interwoven into the design of an instructor/operator console. The application involves the process, persons, and a machine within the context of a flight simulator. The tasks of the instructor and student are primary in the design process. The efficiency and economy of the task analytic process has implications for its use in the future developments of automated flight training. (Author)

N82-13149/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Edwards, CA. Hugh L. Dryden Flight Research Center.
Analysis of a Longitudinal Pilot-Induced Oscillation Experienced on the Approach and Landing Test of the Space Shuttle.
J. W. Smith. Dec 81, 45p NASA-TM-81366

During the final free flight (FF-5) of the shuttle's approach and landing tests, the vehicle experienced pilot-induced oscillations near touchdown. The light test data showed that pilot inputs to the hand controller reached peak-to-peak amplitudes of 20 deg at a frequency between 3 and 3.5 radians per second. The controller inputs were sufficient to exceed the priority rate limit set in the pitch axis. A nonlinear analytical study was conducted to investigate the combined effects of pilot input, rate limiting, and time delays. The frequency response of the total system is presented parametrically as a function of the three variables. In general, with no dead time, for controller inputs of 5 deg or less, the total system behaves in a linear fashion. For 10 deg of controller input, independent of the delay time, the elevon loop will be rate saturated above a frequency of 4 radians per second.

N82-13662/3 PC **A09**/MF **A01**
Ohio State Univ., Columbus. Dept. of Industrial and Systems Engineering.
An Investigation into Pilot and System Response to Critical in-Flight Events, Volume 1.
Final Report, 27 Oct. 1978 - 26 Jun. 1981.
T. H. Rockwell, and W. C. Giffin. Jun 81, 200p NASA-CR-166243-V-1
Contracts NAS2-10047, NAG2-75

The scope of a critical in-flight event (CIFE) with emphasis on pilot management of available resources is described. Detailed scenarios for both full mission simulation and written testing of pilot responses to CIFE's, and statistical relationships among pilot characteristics and observed responses are developed. A model developed to described pilot response to CIFE and an analysis of professional fight crews compliance with specified operating procedures and the relationships with in-flight errors are included.

N82-13663/1 PC **A08**/MF **A01**
Ohio State Univ., Columbus. Dept. of Industrial and Systems Engineering.
An Investigation into Pilot and System Response to Critical in-Flight Events, Volume 2.
Final Report, 27 Oct. 1978 - 26 Jun. 1981.
T. H. Rockwell, and W. C. Giffin. Jun 81, 151p NASA-CR-166243-V-2
Contracts NAS2-10047, NAG2-75

Critical in-flight event is studied using mission simulation and written tests of pilot responses. Materials and procedures used in knowledge tests, written tests, and mission simulations are included

N82-13664/9 PC **A04**/MF **A01**
Computer Sciences Corp., Mountain View, CA.
Visual/Motion Cue Mismatch in a Coordinated Roll Maneuver.
D. K. Shirachi, and R. S. Shirley. May 81, 51p NASA-CR-166259, CSCR-9
Contract NAS2-9741

The effects of bandwidth differences between visual and motion cueing systems on pilot performance for a coordinated roll task were investigated. Visual and motion cue configurations which were acceptable and the effects of reduced motion cue scaling on pilot performance were studied to determine the scale reduction threshold for which pilot performance was significantly different from full scale pilot performance. It is concluded that: (1) the presence or absence of high frequency error information in the visual and/or motion display systems significantly affects pilot performance; and (2) the attenuation of motion scaling while maintaining other display dynamic characteristics constant, affects pilot performance.

N82-13665/6 PC **A99**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Proceedings of the Seventeenth Annual Conference on Manual Control.
15 Oct 81, 693p NASA-CR-165005, JPL-PUB-81-95
Contract NAS7-100
Conf. Held in Los Angeles, 16-18 Jun. 1981; Sponsored by NASA and Onr.

No abstract available.

5I. Personnel Selection, Training, and Evaluation

AD-A108 134/8 PC **A05**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Cable Splicing Installation and Maintenance Career Ladder, AFSC 361X1, July 1981.
Occupational survey rept.
Jul 81, 80p

This is a report of an occupational survey of the Cable Splicing Installation and Maintenance career ladder (AFSC 361X1) completed by the Occupational Analysis Branch, USAF Occupational Measurement Center in June 1981. The survey was requested by the Sheppard Technical Training Center (STTC) in order to determine what impact the recent merger of all Cable Splicer/Maintenance personnel will have on training requirements. (Author)

AD-A108 194/2 PC **A02**/MF **A01**
Army Medical Research Unit, Europe.
Employed Wives of US Army Members in Germany Fare Better Than Those Unemployed,
Frederick J. Manning, and Emily M. DeRouin. 1981, 4p
Pub. in Military Medicine, v146 n10 p726-728 Oct 81.

No abstract available.

AD-A108 206/4 PC **A10**/MF **A01**
Resource Consultants, Inc., McLean, VA.

Development of Officer Requirements Study.
Final rept. Nov 80-Jun 81,
Edward W. Lull. Jun 81, 201p
Contract N00014-81-C-0125

The officer requirements study examined methodologies for determining officer requirements in the Navy, DoD, other government agencies, and private industry. Very few relevant methodologies were found to exist. Nonetheless, eleven alternative methodologies were developed, and a series of recommendations were presented to solve the officer requirements problem. (Author)

AD-A108 213/0 PC **A07**/MF **A01**
Training Analysis and Evaluation Group (Navy), Orlando, FL.
An Assessment of the Navy Curriculum and Instructional Standards Office (CISO).
Technical rept.,
Eugene R. Hall, Larry H. Ford, and Morris G. Middleton. Oct 81, 134p Rept no. TAEG-110

Within the Naval Education and Training Command, Curriculum and Instructional Standards Offices (CISOs) are responsible for training quality assurance at local training activities. This study evaluated the CISO concept and its implementation. While the concept is basically sound, it has not been well implemented. Consequently, recommendations were developed for improving the operations of CISOs and for increasing their contributions to training quality assurance.

AD-A108 232/0 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Computer-Based Education Research Lab.
Effect of Different Instructional Methods on Error Types and the Underlying Dimensionality of the Test. Part I.
Research rept.,
Menucha Birenbaum, and Kikumi Tatsuoka. Feb 81, 49p Rept no. CERL-RR-81-3
Contract N00014-79-C-0752

Error Analyses performed on data sets revealed that students used a variety of rules of operation for solving the signed-number arithmetic problems. The data sets were obtained from an experimental study in which students were randomly assigned to study either of two lessons written on a computer-based education system. The two lessons used different conceptual frameworks; verbal stories and the number line. This paper deals with the early stages of learning in which the students applied different rules of operation. These systematic sources of variation in the data resulted in increased dimensionality. Moreover, the variety of algorithms (rules of operation) used by the students in both treatment groups supported the assertion that the two instructional methods were at least partially responsible for individual differences in information processing. (Author)

AD-A108 293/2 PC **A07**/MF **A01**
Personnel Decisions Research Inst., Minneapolis, MN.
Reenlistment Motivations of First-Term Enlisted Men and Women.
Final rept.,
Stephan J. Motowidlo, Marvin D. Dunnette, and Rodney L. Rosse. Feb 80, 145p ARI-RN-81-7
Contract DAHC19-78-C-0020

The purpose of this research was to identify attitudes and motives underlying reenlistment decisions of first-tour soldiers. The research focused on determining what changes in reenlistment options and incentives might succeed in retaining effective soldiers for a second tour of service. Accordingly, a questionnaire was developed to tap reenlistment motives and attitudes, and then it was administered to 4,671 soldiers stationed in the U.S. and Europe. In addition, supervisory ratings of effectiveness were obtained for 2,444 soldiers in this sample.

AD-A108 312/0 PC **A14**/MF **A01**
Research, Inc., Arlington, VA.
Study of Army Manpower Requirements, Determination Procedures, and Organization. Volume I.
Final rept. 23 Sep 80-23 Sep 81,
G. H. Smith, R. W. Hartt, W. C. Frank, H. S. Gillogly, and R. D. Collins. 23 Sep 81, 317p Rept no. PI-TR-492-VOL-1
Contract MDA903-80-C-0726
See also Volume 2, AD-A108 313 and Addendum, AD-A108 314.

This is the final report on a project to provide requisite information for a decision to adopt a functionally oriented approach to the development of manpower requirements for Army Table of Distribution and Allowance activities. The information covers the major areas for decision consideration, including: required organization, mission, functions, resources, training, procedures, planned objectives and related workload, and utilization of program outputs.

AD-A108 313/8 PC **A06**/MF **A01**
Research, Inc., Arlington, VA.
Study of Army Manpower Requirements, Determination Procedures, and Organization. Volume II. Appendixes.
Final rept. 23 Sep 80-23 Sep 81,
G. H. Smith, R. W. Hartt, W. C. Frank, H. S. Gillogly, and R. D. Collins. 23 Sep 81, 109p Rept no. PI-TR-492-VOL-2
Contract MDA903-80-C-0726
See also Volume 1, AD-A108 312 and Addendum, AD-A108 314.

For abstract, see AD-A108 314.

AD-A108 314/6 PC **A02**/MF **A01**
Research, Inc., Arlington, VA.
Study of Army Manpower Requirements, Determination Procedures, and Organization. Addendum.
Final rept. 23 Sep 80-23 Sep 81,
G. H. Smith, and R. W. Hartt. 23 Sep 81, 9p Rept no. PI-TR-492-ADD
Contract MDA903-80-C-0726
Addendum to Volume 1, AD-A108 312 and Volume 2, AD-A108 313.

Development of the optimum organization and procedures for establishing a workload based manpower standards driven Requirements Determination program is discussed. (Author)

AD-A108 322/9 PC **A05**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Integrated Avionics Manual Test Station and Component Specialty AFSCs 326X5A/B.
Occupational survey rept.
Nov 81, 88p Rept no. AFPT90-326-428E

Contents: Survey Methodology; Job Structure Analysis; Analysis of DAFSC Groups; Comparison of Survey Data to AFR 39-1 Specialty Descriptions; Analysis of Major Command Differences; Analysis of CONUS Versus Overseas Groups; Analysis of Aircraft; Training Analysis; Job Satisfaction Indicators.

AD-A108 380/7 PC **A02**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Forecasting Staffing Needs in a Navy Research Laboratory.
Special rept. Jan-Jun 81,
Mark Chipman. Nov 81, 18p Rept no. NPRDC-SR-82-7

Like many government organizations, the Navy Personnel Research and Development Center (NAVPERSRANDCEN) faces restrictions regarding the number of personnel it may hire. In order to justify its existing billets or positions, NAVPERSRANDCEN must demonstrate that it is effectively using its current allocation of billets. This, in turn, requires accurate predictions of future attrition so that the lead time associated with recruiting and hiring new personnel can precede personnel losses without incurring long periods of billet vacancy. The purpose of this effort was to provide a methodology capable of forecasting at the lowest level of aggregation possible, the number and type of personnel vacancies far enough in advance to allow time for recruiting and hiring. Findings indicated that NAVPERSRANDCEN attrition can be forecast with a sufficient degree of accuracy. (Author)

AD-A108 381/5 PC **A03**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
A Longitudinal Analysis of Navy Family Separation,
D. Stephen Nice. Nov 81, 33p Rept no. NPRDC-TR-82-15

The attitudes, psychological adjustment, and health of Navy wives whose husbands were deployed were compared with those of Navy wives whose husbands were at home. Similarly, attitudes, stress, and reenlistment intentions were assessed in the deployed and nondeployed groups of husbands. Pre-, mid-, and postseparation interviews with the wives revealed that separated wives exhibit higher levels of depressive affect and visit the doctor more frequently than do nonseparated wives. The majority of the psychological variables, however, revealed no differences between the groups. The wife's attitude toward reenlistment, the husband's attitude toward the Navy, and the husband's perception of family stress were the best predictors of his reenlistment intention. Data further indicated that the morale of the men in both groups declined over the 7-month period of the study. (Author)

AD-A108 397/1 PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Psychology.
A Follow-Up Study of Marines Two and a Half Years after Recruit Training.
Technical rept.,
Irwin G. Sarason, Raymond W. Novaco, and Barbara R. Sarason. 20 Nov 81, 23p Rept no. AR-006
Contract N00014-77-C-0700
Prepared in cooperation with California Univ., Irvine.

This report describes a follow-up study of 228 Marines two and a half years after they received recruit training at MCRD, San Diego. A sample of Marines who began recruit training in October 1978 participated in a follow-up study. The subjects completed a questionnaire dealing with their recollections of recruit training, their current assignments, and their plans for the future. At the same time, commanding officer's provided information about the subjects' job performance, abilities, and problems. Information provided by the subjects and their commanding officers was related to performance in recruit training and ratings made by drill instructors. The results suggested that the subjects are dedicated Marines who, in general, see their recruit training experiences as having been very valuable, and, in particular, esteem the help they received from their drill instructors. Despite their positive attitudes toward the Marine Corps at the time of study, a high percentage of the subjects do not plan to re-enlist. Unfulfilled needs for personal growth in the areas of education and training seemed to play a role in re-enlistment plans. Drill instructors' ratings correlated significantly with a variety of performance measures 2-1/2 years after recruit training.

AD-A108 398/9 PC **A03**/MF **A01**
Washington Univ., Seattle. Dept. of Psychology.
Cognitive Correlates of Outcome and Performance in Marine Corps Recruit Training.
Technical rept.,
Gregory L. Robinson, Raymond W. Novaco, and Irwin G. Sarason. 20 Oct 81, 43p Rept no. AR-005
Contract N00014-77-C-0700
Prepared in cooperation with California Univ., Irvine.

This report describes relationships between assessed psychological characteristics and performance and attrition among Marine Corps recruits. The characteristics assessed were interpreted as measures of threat perceived by recruits. Recruits who were under high levels of threat showed the most unfavorable recruit training outcomes. Of the psychological indices, test anxiety was the one that related most strongly to attrition and performance. (Author)

AD-A108 400/3 PC **A02**/MF **A01**
Air Force Human Resources Lab., Brooks AFB, TX.
Interrater Reliability: The Development of an Automated Analysis Tool.
Technical paper,
Michael R. Staley, and Johnny J. Weissmuller. Nov 81, 12p Rept no. AFHRL-TP-81-42
Presented at the Annual Conference of the Military Testing Association (23rd), 26-30 Oct 81.

The Comprehensive Occupational Data Analysis Programs (CODAP) system is a basic tool in both operational job analysis and in occupational research. This system of programs is augmented and enhanced to meet changing requirements from the research community. In particular, this paper discusses the development and evolution of interrater reliability procedures. The history of these procedures is traced from techniques in use prior to its inclusion in the CODAP system through to the present time. This paper explains the program capabilities in terms of the research requirements which necessitated the enhancements and may be used as analyst's guide in the future. The paper closes by examining current research systems,

potential applications, and the operational use of the newest version of this program aimed at fulfilling these anticipated needs. (Author)

AD-A108 407/8 PC **A11**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
Job Satisfaction and Civilian Auditor Turnover within the Air Force Audit Agency.
Master's thesis,
George E. Hanby, and Bruce K. Zimmerman. Jun 81, 231p Rept no. AFIT-LSSR-5-81

This research uses a conceptual model as the medium through which elements of job satisfaction are related to turnover. A survey questionnaire was developed for this study and administered to all AFAA civilian auditors. Responses to the questions were analyzed using factor analysis, multiple linear regression, and comparative analyses. The result of these analyses was a synthesized model that identifies seven significant determinants of job satisfaction for civilian auditors, the variable 'opportunity' intervening between satisfaction and turnover, and two demographic variables that significantly correlate to the propensity to leave the organization. A regression equation is presented which indicates that Audit Agency management could most significantly influence job satisfaction through psychological needs of employees, promotion opportunities, and characteristics of supervisors. Comparative analyses of the components of psychological needs suggests that in the categories termed 'esteem need' and 'security need' AFAA civilian auditors have relatively higher need deficiency scores that their counterparts in similar job frameworks. Observed motivating potential scores indicate that job enrichment could meet with favorable results.

AD-A108 435/9 PC **A07**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
Better Management of Private Pension Plan Data Can Reduce Costs and Improve ERISA Administration.
19 Oct 81, 129p Rept no. GAO/HRD-82-12
Report by the Comptroller General.

The Employee Retirement Income Security Act requires private pension plans to report information for the Department of Labor, the Internal Revenue Service, and the Pension Benefit Guaranty Corporation, the agencies responsible for administering and enforcing the act. However, there is no assurance that all plans are reporting as required and that all insured plans are paying premiums. When plans do report, data are often missing or inaccurate. Efforts to correct the situation have been ineffective and duplicative. Certain reports are seldom used. Although actions have been taken, and more are planned, to improve information reporting and accuracy, these actions will not fully resolve the problems GAO identified. Therefore, GAO recommends that the Congress, the Departments of Labor and the Treasury, and the Pension Benefit Guaranty Corporation reduce reporting requirements, assure the collection of insurance premiums, and improve efforts to obtain accurate and complete data. (Author)

AD-A108 436/7 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
Information on Prime Sponsor CETA Expenditures Related to Membership Organizations.
28 Oct 81, 31p Rept no. GAO/HRD-82-5
Report to the Honorable William L. Clay, House of Representatives.

GAO reviewed prime sponsor use of Comprehensive Employment and Training Act funds for activities related to membership organizations. This report contains information on: the Department of Labor's authority to permit prime sponsors to purchase memberships or services from membership organizations; prime sponsor expenditures of $1.8 million in fiscal year 1979 CETA funds for activities related to membership organizations; the variety of services membership organizations provide to prime sponsors; the benefits accruing to CETA participants from the various services; and applicable lobbying prohibitions and actions membership organizations have taken to comply with such prohibitions. Prime sponsors believe expenditures related to membership organizations are justified because the services they provide are worth the cost and are frequently more useful than those provided by Labor. (Author)

AD-A108 443/3 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Management Training Seminars Sponsored by the National Institutes of Health,
22 Sep 81, 12p Rept no. GAO/FPCD-81-75

We reviewed management training seminars sponsored by the National Institutes of Health (NIH) including the procedures NIH used to determine: the need for specific management training seminars; who attends these seminars; the locations of the seminars; and whether competitive procurement practices are followed when consultants conduct training. We reviewed available documents relating to management training seminars identified by NIH as having been conducted during fiscal years 1979, 1980, and 1981 and interviewed cognizant agency training and procurement officials.

AD-A108 455/7 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. General Government Div.
Postal Service Employee Development Programs Need Better Management.
30 Sep 81, 11p Rept no. GAO/GGD-81-107
Report to the Postmaster General.

The objective of this review was to determine if management controls over programs which provide training or developmental experiences to postal employees should be strengthened. The findings suggest that (1) program instructions were not always followed; and (2) some programmatic changes are needed. Weaknesses found are described: Some postal career executive candidates received no developmental training and experiences; Candidate lists for officer-in-charge assignments were not properly maintained or used; Employee performance evaluations were not always prepared; and Some significant program costs were not accumulated.

AD-A108 479/7 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Staffing, Funding, and Use of Military Bands.
23 Sep 81, 11p Rept no. GAO/FPCD-81-72

Our objective was to provide historical and current information concerning the funding, staffing, and use of the bands. To do this, we interviewed personnel responsible for band operations at each of the services and obtained documentation on funding and personnel levels at each of the services. We did not verify the accuracy of the information the services provided. Since 1964, the bands have experienced a slow but steady decline in both the number of bands and the number of band members. The most recent reduction in the number of band members resulted from the congressionally mandated 10 percent appropriation cut in the fiscal year 1978 budget. At that time the services established their current personnel ceilings, which, with the exception of the Air Force, are expected to remain constant through fiscal year 1982. The services do not include in their authorized personnel strength figures any recruits at training centers who are temporarily placed in recruit class bands.

AD-A108 482/1 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
Overpayments of Education Benefits Could Be Reduced for Veterans Enrolled in Noncollege Degree Courses.
30 Sep 81, 11p Rept no. GAO/HRD-81-154

Records of the 120 terminated veterans we reviewed showed that one-third of them were paid for more than their allowable number of absences. Also, because of VA's practice of paying benefits before knowing whether the veteran attended class, many veterans who dropped training were overpaid. Under VA's current policy no effort is made to collect overpayments for excess absences. Because an accounts receivable is not established, the veteran is not notified that he or she was overpaid. Likewise, no deduction is made from other VA benefits payable, such as compensation, pension, or educational benefits if the veteran enters any type of training other than NCD. If the results of our limited sample are representative of the NCD overpayment problem, it could prove to be a significant amount nationwide. We believe that most of the overpayments in the NCD program were attributable to weaknesses in the attendance reporting system and that overpayments could be reduced if veterans were required to certify their class attendance monthly rather than quarterly. This procedure would be substantially the same as that now used for veterans taking on-the-job and apprenticeship training. (Author)

AD-A108 499/5 PC **A05**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
Application of a Multifactor Approach to Transfer of Training Research.
Technical rept. 1 May 80-31 Jul 81,
Charles W. Simon, and Stanley N. Roscoe. Jul 81, 91p CWS-01-82, NAVTRAEQUIPC-78-C-0060-6
Contract N61339-78-C-0060

Multifactor transfer of training experiments are expensive to perform because of the large number of subjects required, the extended training they receive, and their subsequent operational testing. More economical data collection techniques are needed to fulfill the mission of the Naval Training Equipment Center's Visual Technology Research Simulator. An experimental effort was undertaken: to establish relationships among training, test, and transfer scores in the context of the manual control of a maneuvering vehicle; to determine the relative complexities of response surfaces for training, test, and transfer; to demonstrate a new transfer research paradigm that makes economically feasible the simultaneous investigation of the effects of a large number of equipment design variables on the transfer to multiple test configurations; and to extract from the simulator characteristics to be estimated with minimum costs. In this initial experiment the following relationships between training and transfer performance were indicated: the transfer surface appeared less complex than the training surface; the relationship between training and transfer scores were positive but too weak for predictive purposes; some factors had large effects in training and small effects in transfer, and vice versa; and transfer was facilitated when the values of certain variables result in training conditions that were more difficult than the subsequent transfer criterion conditions.

AD-A108 536/4 PC **A02**/MF **A01**
Army Recruiting Command, Fort Sheridan, IL.
Factors Affecting U.S. Army Recruiting.
Final rept.,
Gerald A. Klopp. Sep 81, 18p Rept no. RM-81-3

This paper compares seven models which were developed to explain the relationships between recruiting variables and the accomplishment of the recruiting mission. The evaluation considered three Army models developed by contract, two Army models developed in-house, and two Navy models. The paper discusses common problems which were found in several of the models: collinearity, homoscedasticity, and lack of sufficient statistical tests and prediction interval determination. The Army's Enlistment Prediction model (EPM) is used to illustrate the presence of collinearity. The paper concludes with soem comments on the use of analysis, as well as management involvement when prediction models are used for mission assignment. (Author)

AD-A108 650/3 PC **A03**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Evaluation of Aptitude and Achievement Composites for the Initial Classification of Marine Corps Officers.
Interim rept.,
Rebecca D. Hetter, and Norman M. Abrahams. Sep 81, 38p Rept no. NPRDC-TR-81-21

As part of an ongoing project to develop a classification system for Marine Corps officers, aptitude, background, and performance data routinely collected by the Marine Corps were analyzed to determine their usefulness as predictors of performance in 12 follow-on specialty schools. Four schools had samples large enough for the development and cross-validation of multiple regression composites. Evaluation of manual and computer-assisted optimal assignment methods based on the composites indicated that the composites are effective in differentially predicting follow-on school performance. (Author)

AD-A108 675/0 PC **A13**/MF **A01**
Dittberner Associates, Inc., Bethesda, MD.

Advanced Military Pay System Concepts. Evaluation of Opportunities through Information Technology.
Jul 80, 299p
Contract N00014-79-C-0686

This research deals with the Navy system for managing pay and allowances for both active and retired Navy personnel. Its focus has been to understand the current system and its limitations, as well as to forecast technologically feasible alternative methods by which this pay system could be significantly improved and upgraded in the early 1990s, with primary emphasis on shipboard pay procedures. Conclusions include: (1) Continued use of the U.S. Postal Service gives rise to intolerable delays and the resultant errors in pay records leading to gross inefficiencies in shipboard pay administrative resource use; (2) Electronic transmission of field transactions and LES data will solve most shipboard pay problems and will permit exception reporting from the field; (3) Several valid and manageable advanced system concepts have been identified. Each offers members better service, significant reductions in shipboard pay administration and a viable wartime pay methodology; (4) The requirement for allotment payment check distribution makes full decentralized shipboard-level payroll computation (exclusively) impractical; and (5) A high degree of centralization of Naval military pay records and computational support can and should continue to exist, since the proposed use of commercial satellite channels for data transmission has a usage-related cost insensitive to distance.

AD-A108 699/0 PC **A04**/MF **A01**
Center for Naval Analyses, Alexandria, VA. Inst. of Naval Studies.
A Rating Assignment Procedure to Increase First-Term Retention,
James S. Thomason, and Kathye D. Rutledge. Aug 81, 75p Rept no. CRC-453
Contract N00014-76-C-0001

Recruits who are 17 years old, or have fewer than 12 years of education, or did not participate in the Delayed Entry Program, and show no preference among A-school assignments can be assigned to A-schools in 60 ratings in a way that will increase their chances of completing the first term of service. The stability of these assignment guides is demonstrated across three recruit cohorts. The procedure can be incorporated easily and inexpensively into the Navy's rating assignment procedure. (Author)

AD-A108 703/0 PC **A04**/MF **A01**
University of Southern California, Los Angeles. Behavioral Technology Labs.
An Experimental System for Research on Dynamic Skills Training.
Interim technical rept. Feb 80-Sep 81,
Allen Munro, Douglas M. Towne, and Michael R. Fehling. Sep 81, 59p Rept nos. TR-96, TR-1
Contract N00014-80-C-0164

Academic research on computer based instruction (CBI) has dealt largely with CBI of knowledge systems, coherent bodies of essentially propositional knowledge. Little research has been performed on techniques for effective CBI of dynamic skills, those amalgams of perceptual, motor, and decision-making skills that are required by many real-time event-driven tasks. The demands of dynamic skill training on student processing resources are different from those of knowledge system teaching. These differences suggest that the techniques found to be effective in conventional CBI may not be applicable to dynamic skill training CBI. Two classes of research issues to be explored are techniques for presentation of simulation practice and methods for providing effective instructional feedback. A microcomputer-based experimental simulation training system for research on dynamic skill training is described. Experimental subjects are taught to perform a simulation task based on the job of an air intercept controller. The training program permits controlled differences in instructional treatment for different groups of students, in order to explore empirical issues in dynamic skill training. (Author)

AD-A108 705/5 PC **A06**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Wideband Communications Equipment, Ground Radio Communications, and Space Communications Systems Equipment Specialties, AFSs 304X0/304X4/304X6.
Occupational survey rept.
Nov 81, 102p
See also AD-A108 706, AD-A108 707 and AD-A108 708.

Inventory booklets were administered to Wideband Communications Equipment (AFS 304X0), Ground Radio Communications (AFS 304X4), and Space Communications Systems Equipment (AFS 304X6) personnel worldwide. Survey results are based on the responses of 3,010 AFS 304XX incumbents (approximately 39 percent of assigned). A total of 31 different major job groups were identified. DAFSC 304X0, 304X4, and 304X6 personnel were found to be performing distinctly different technical radio maintenance type jobs. Only with jobs involving supervision, administration, or training were substantial percentages of personnel from all three career ladders found. DAFSC 304X6 personnel were noted to use the highest number of electronic principles subject areas, followed closely by DAFSC 304X4 personnel. While many of the subject areas were used in common across the specialties, a number of subject areas were noted as being peculiar to only one career ladder. Based on the analysis of tasks and jobs performed by 304X0, 304X4, and 304X6 personnel, a merger of these three specialties does not appear feasible at this time. In addition to task differences, job satisfaction, equipment, and electronic principle differences were noted for the personnel in the three specialties. All of these factors would have negative impact on the overall 304XX career field if the three career ladders were consolidated.

AD-A108 706/3 PC **A06**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Wideband Communication Equipment Specialty, AFSC 304X0.
Occupational survey rept.
Nov 81, 108p
See also AD-A108 707, AD-A108 705 and AD-A108 708.

Inventory booklets were administered to Wideband Communications Equipment (AFS 304X0) personnel worldwide. Survey results are based on the responses of 996 incumbents (35 percent of assigned). DAFSC 304X0 personnel were found to be performing a wide variety of jobs. Twenty different jobs were identified, with a majority of the personnel performing maintenance or installation functions on a variety of wideband communications equipment. In addition, 12 of the 20 major job groups were identified as performing a nontechnical type of job involving administration, supervision, or training. Job satisfaction data for each of the 20 major job groups were examined, and the most dissatisfied personnel were found to be performing a job control or Engineering and Installation (E&I) type of job. Three-skill level personnel spend most of their time maintaining transmitters, performing support functions, performing equipment operation functions, or maintaining voice and teletype multiplexers. DAFSC 30450 personnel spend slightly less time on these types of duties and spend somewhat more time on supervisory or training functions. Seven-skill level personnel are primarily firstline supervisors, and roughly divide their time performing supervisory and radio maintenance duties.

AD-A108 707/1 PC **A02**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Ground Radio Communication Specialty, AFSC 304X4.
Occupational survey rept.
Nov 81, 13p
See also AD-A108 705, AD-A108 706 and AD-A108 708.

Inventory booklets were administered to Ground Radio Communications (AFS 304X4) personnel worldwide. Survey results are based on the responses of 1,618 AFS 304X4 incumbents (38 percent of assigned). DAFSC 304X4 personnel were found to be performing 22 different types of jobs. The personnel in 10 of these major job groups (comprising a majority of the sample) are performing a technical job involving some aspect of ground radio equipment maintenance or installation. The types of jobs performed by these personnel involve maintaining air traffic control equipment, mobile communications equipment, GIANT TALK equipment, missile equipment, or the installation of this equipment. The personnel in the remaining 12 major job groups perform a nontechnical job involving administration, supervision, or training. It appears that 304X4 first-termers are responsible for more of the total 304X4 maintenance workload than ever before. Thus, resident technical training and OJT personnel need to be aware of this trend and make necessary adjustments. In addition, trainers and managers should look at the feasibility of creating separate AFSCs for job control and E&I personnel in the 30XXX career field.

AD-A108 708/9 PC **A05**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Space Communications Systems Equipment Specialty, AFSC 304X6.
Occupational survey rept.
Nov 81, 81p
See also AD-A108 707, AD-A108 706 and AD-A108 705.

Inventory booklets were administered to Space Communications Systems Equipment (AFS 304X6) personnel worldwide. Survey results are based on the responses from 361 AFS 304X6 incumbents (59 percent of assigned). DAFSC 304X6 personnel were found to be performing a wide variety of jobs. Space communications Systems Personnel and 2045th SATCOM Group Personnel make up a majority of the 304X6 personnel surveyed, and they perform jobs involving earth terminal maintenance or operation functions. A somewhat smaller number of 304X6 personnel were found to be performing jobs involving supervision, administration, or training. Three-skill level personnel spend roughly one-fourth of their time performing earth terminal operations, with the remainder of their time being spent on earth terminal maintenance duties. Seven-skill level personnel are firstline supervisors, and divide their time performing supervisory and earth terminal operations and maintenance duties. Managers and trainers need to look at the possibility of moving 304X6 operator personnel to the proposed new Space Operations Specialty (AFS 308X1), since it appears that sending personnel to a maintenance oriented technical school and then assigning them to an operator job is a waste of training dollars. In addition, managers and trainers should look at the feasibility of creating a separate AFSC for job control in the 30XXX career field.

AD-A108 717/0 PC **A09**/MF **A01**
Institute for Defense Analyses, Arlington, VA. Science and Technology Div.
Cost-Effectiveness of Maintenance Simulators for Military Training.
Final rept.,
Jesse Orlansky, and Joseph String. Aug 81, 196p
IDA-P-1568, IDA/HQ-81-23233, SBI-AD-E500 446
Contract MDA903-79-C-0202

The cost-effectiveness of maintenance simulators, compared to actual equipment trainers, is evaluated for training military maintenance technicians. Maintenance simulators are as effective as actual equipment trainers when measured by student achievement at school; there is no difference in the job performance of students trained either way, according to supervisors' ratings, in only one study. The acquisition cost of maintenance simulators is typically less than that of actual equipment trainers. The cost to develop and fabricate one unit of a simulator was less than 60 percent of the cost of its counterpart actual equipment trainer in 7 of 11 cases investigated. The cost of fabricating an additional unit of the simulator was less than 20 percent of the cost of its counterpart actual equipment trainer in 9 of these 11 cases. Acquisition and use of a maintenance simulator over a 15-year period would cost 38 percent as much as an actual equipment trainer, according to the only life-cycle cost comparison that has been reported. Since maintenance simulators and actual equipment trainers are equally effective and since maintenance simulators cost less, it is concluded that maintenance simulators are cost-effective compared to actual equipment trainers.

AD-A108 740/2 PC **A08**/MF **A01**
SRI International, Arlington, VA.
Evaluation of the North Island A/C Crash/Rescue Training Facility,
R. S. Alger, and W. H. Johnson. Aug 81, 153p
Contract N00014-80-C-0696

Under Executive Order 11752, the Navy and the Air Force began a cooperative effort to develop training facilities that could provide more fire fighting training with less smoke and water pollution. Soon the central issue of pollution control was surrounded by a series of satellite questions that had to be answered before

training facilities could be designed, e.g., what type of training is required; how much training should be provided; where should fireman train; and how much departure from the real emergency situation is permissible. Various public and private groups contributed answers. The Naval Air Station, North Island, San Diego, Calif., Aircraft/Crash Fire Rescue Training Facility is the first Navy facility constructed as an outgrowth of this effort to improve training while reducing the environmental impact to an acceptable level. This report evaluates the performance of the North Island facility in a series of environmental and training tests. The scope includes: (1) the evaluation procedure and results; (2) a comparison to other training options; and (3) recommendations for future training activity.

AD-A108 744/4 PC **A06**/MF **A01**
Naval Training Equipment Center, Orlando, FL.
An Analysis of Microcomputer Technology for Application to Real-Time Trainers.
Technical rept. Jul 76-Apr 79,
Charles F. Summer, and Gerald A. Wyndle. Jul 79, 107p Rept no. NAVTRAEQUIPC-IH-313

Conceptual approaches to introducing advanced microcomputer technology in real-time trainers were investigated. Four types of computer system architectural approaches were examined and eliminated for various reasons. Eight available microcomputer/microprocessor modular families were also analyzed for trainer application. A conventional general purpose system was synthesized and used as a baseline for comparison. A unique functionally modular multiple microcomputer architecture is described that will satisfy the processing, computation and control requirements of modern high performance trainers. A life cycle cost model is described and the life cycle cost of the conventional GP approach is compared with the life cycle cost of the multiple microcomputer approach. Technologies required to achieve the unique architecture are summarized and a hardware-firmware (microcode)-software system control algorithm is described in conceptual terms.

AD-B057 843/5 PC **A14**/MF **A01**
Louisville Univ., KY. Systems Science Centre.
A Living Systems Theory Analysis of Army Battalions Impacted by the Battalion Training Management System.
Final rept.,
Lorena R. Peter, and Gordon C. Ruscoe. Apr 81, 310p
Contract DABT60-80-C-0021
Supersedes AD-B056 950L.
Distribution limitation now removed.

The purpose of this study was to evaluate the impact of the Battalion Training Management System (BTMS) workshops on battalion training from the perspective of Living Systems theory (LST). BTMS provides a framework within which to implement the latest developments in U.S. Army training management doctrine. Through four workshops, aimed at different battalion echelons, the materials and the guidance for use of these materials were disseminated to U.S. Army Forces Command battalions. Findings of the study are described first in terms of information and materiel/resources processing difference that distinguish more from less effective battalions. The impact of the BTMS workshops is discussed, with special attention to their influence on the flow of training and information through the battalion. Next, the rationale and statistical bases for a diagnostic tool developed for use by battalion commanders in monitoring the performance of their units. In general, the study findings emphasize the importance of information processing in improving training and in enhancing unit effectiveness. Distinctive patterns of information processing mark more effective units, both in terms of how the battalion as a whole engages in information processes and in terms of how key personnel in the unit spend their time in these processes. Effective battalions are characterized by a decentralized and differentiated pattern of information flow, especially with regard to monitoring unit training activities and making decisions to control training.

N82-13123/6 PC **A08**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Guidelines for Line-Oriented Flight Training, Volume 2.
J. K. Lauber, and H. C. Foushee. 1981, 156p NASA-CP-2184-V-2
Proceedings of Conf. Held at NASA Ames Research Center, Calif., 13-15 Jan. 1981.

No abstract available.

N82-13153/3 PC **A03**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Hamburg (Germany, F.R.).
Results and Experience with a Small Multipurpose Tracking Simulator Ergebnisse und Erfahrungen MIT Einem Kleinsimulator fuer Tracking- und Mehrfacharbeitsuntersuchungen.
S. Fichtbauer. 1980, 33p
In German; English Summary. Presented at 12TH Conf. Of the West European Soc. For Aviation Psychology, Kollekolle, Denmark, 24-28 Sep. 1979.

The performance results on three prototype tracking simulators are reported, compared and supplemented by a factor analytical study. Test results on motor coordination and on performance under multiple-tasks conditions are discussed. The performance structure analysis reveals a five-factors solution with interpretation as to error, numerical thinking, observation speed, spatial relations recoptivity, and psychomotor coordination. Its relation to other psychomotor apparatus tests used in pilot selection is discussed.

PB82-139874 PC **A15**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Political Science.
Politics and Labor Markets: Toward an Explanation of the Formation and Adoption of U.S. Labor Market Policy.
Final rept.,
David Brian Robertson. Aug 81, 332p DLETA-SS-18-81-15-1
Sponsored in part by Social Science Research Council, Washington, DC.

A study of the formation and adoption of federal labor market programs. Examines the origins of the U.S. Employment Service and the Manpower Development and Training Act. Develops concepts for policy analysis, including program design (basic legislative and administrative decisions concerning the changes sought, tools applied, population served, agents used, organizations established, and budgets committed), program premises (the elements of these decisions), and an original typology of the causes of public policy. These concepts are applied to the USES and MDTA in case studies that depend on evidence drawn from Congressional and administrative documents, archives, books, magazines, and an interview. The study concludes (1) that labor market programs largely perform as they are designed to perform, (2) that American labor market programs are designed to exert minimal federal control and to adjust the supply of unorganized labor to demand, and (3) that structural factors and ideas within the government are the most important causes of federal labor market policy design in the U.S. Includes an extensive bibliography of federal labor market policy.

PB82-141532 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
The Vietnam ERA Veteran Challenge for Change. Comprehensive Summary of Proceedings of the Administrator's Seminars on Vietnam Era Veterans.
1971, 72p VA/71-5062

In order to accommodate returning Vietnam veterans, the Veterans Administration (VA) held a series of five regional seminars to learn more about the veterans and their unique needs. The seminars sought to increase understanding by a process of involvement and interaction of VA officials with returning veterans. There was a series of three consecutive panels: first, veterans who had served in Vietnam, second, VA employees who had also served in Vietnam, third, the three top leaders of the VA. This publication summarizes the remarks of the VA officials and excerpts panels of the veterans, employees, and top officials. A profile of the Vietnam veteran and statistical information on participants and living veterans of America's wars are included in appendices.

PB82-141581 PC **A03**/MF **A01**
Veterans Administration, Washington, DC.
Role Perception of the Nursing Assistants as Viewed by Head Nurses, Staff Nurses and Nursing Assistants at Tuscaloosa VA Hospital,
J. Elizabeth Stanley. 1969, 47p VA/NPR-67
Prepared in cooperation with Veterans Administration Hospital, Tuscaloosa, AL.

The purpose of this study was to investigate the role of the nursing assistant as perceived by head nurse, staff nurses and nursing assistants on the four psychiatric units of the Veterans Administration (VA) Hospital, Tuscaloosa, Alabama. General agreement in the role of the nursing assistant by all the groups was found. Top priority items defining the nursing assistant role varied, however. Staff nurses and nursing assistants rated promptness as top priority, while only one head nurse did so. Although some discrepancies in role perception were found throughout the 4 units polled, no major discrepancies were noted. A discussion of the activities of the nursing assistant is provided. The report recommends similar studies be conducted in a psychiatric hospital with different methods of treatment and in a general medical-surgical hospital. A bibliography is included.

PB82-141656 PC **A03**/MF **A01**
Veterans Administration, Washington, DC.
Work Sampling Using Self Recording.
Oct 70, 26p VA/70-5054

The brochure is designed to help employees participate in a work sampling study. Work sampling is one technique for estimating the amount of time spent on each observed activity; a random sample of work activity is recorded on a tally sheet either by the worker (self-recording) or by an observer. A history of work sampling is given, procedures and principles are described. A case study of one application of work sampling to develop time distributions was reviewed.

PB82-141698 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
A Study of Head Nurses Perceptions of their Role Preparation,
Carol Lee Williams. Oct 80, 69p VA/NPR-148

The report is a three part descriptive study to determine the knowledge of role responsibility of head nurses. Part 1 details the various functions and responsibilities of the head nurse and reports on the results of a questionnaire sent to 30 head nurses. Of the nurses sampled, those who had received leadership and management theory classes and supervisory support were more aware of their responsibilities and authority. A sample questionnaire is included. Part 2 is a program designed to prepare nurses for head nurse positions, including several learning modules. A section on the head nurse's responsibility in the termination process is also included. Part 3 is a bibliography.

PB82-142498 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
Factors Graduating Student Nurses Consider when Seeking their First Employment,
Robert W. Tichenor. 1971, 72p VA/NPR-60

One purpose of this study was to increase knowledge of senior student nurses in order to plan recruitment. Another purpose was to determine if there is a prevailing stereotype of the Veterans Administration (VA) Nursing Service. The study found that although students considered idealistic factors such as educational opportunities to be most important, realistic factors of salary, advancement opportunities and tour of duty became more important when geographic factors were considered. First jobs were usually found through friends or persons at their home or primary affiliating hospital. The VA Nursing Service image varied, with the most positive attitudes from those whose schools were affiliated with the VA. The report recommends local recruitment rather than national efforts. The VA image could be improved with national advertising emphasizing nursing care to the geriatric and psychiatric patient, not merely custodial care. Contact with nursing schools should also be encouraged. A sample questionnaire is included.

PB82-142506 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
Role Expectations for the Neophyte Staff Nurse in the VA Nursing Service.
1972, 55p VA/NPR-98

In this descriptive study, an attempt is made to define the expectations of practice that nursing personnel hold for the neophyte staff nurse within her first twelve months of employment following completion of a nursing program. Respondents represent the three nursing

programs: Associate Degree, Diploma and Baccalaureate. However, no attempt is made to determine differences in degree and quality of practice between and among graduates of these programs. Sample questionnaires are included. The report concludes that the neophyte and the journeyman nurse did not agree in their expectations. A bibliography is included.

PB82-142910 PC **A16**/MF **A01**
Bureau of Social Science Research, Inc., Washington, DC.
CETA: Accomplishments, Problems, Solutions.
Final rept. 1978-80,
William Mirengoff, Lester Rindler, Harry Greenspan, and Charles Harris. Nov 81, 353p MEL-81-12
Grant DL-24-11-80-01
Supersedes PB81-243834.

The report, on the effects of the 1978 amendments to the Comprehensive Employment and Training Act (CETA), focuses particularly on experience with changes in the public service employment (PSE) programs, but examines also some aspects of CETA management, service delivery systems, the role of organized labor, and job placement. The study is based largely on field reviews of a sample of 28 prime sponsors, conducted in October 1980, about 18 months after the CETA amendments became effective. The reviews were by local analysts, largely from academic or research organizations, who used a common study outline as a basis for examining and assessing experience in their areas.

PB82-143090 PC **A09**/MF **A01**
Maulana Azad Medical Coll., New Delhi (India). Dept. of Anatomy.
Course on Scientific Method in Morphosciences,
Indra Bhargava. Nov 81, 184p
Sponsored in part by Indian Council of Medical Research, New Delhi.

The present course is an attempt towards promoting investigative activity in basic and clinical aspects of morphosciences.

PB82-143116 PC **A02**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course; Course Evaluator.
Apr 75, 18p
Contract PHS-CDC-99-74-72
See also PB82-143512.

A set of 60 multiple choice questions on Industrial Hygiene Chemistry is presented for evaluation of a one week Industrial Hygiene Chemistry course. Questions relate to electrochemical reactions, spectrometry, gas chromatography, x-ray diffraction, atomic absorption, and ionization.

PB82-143207 PC **A06**/MF **A01**
Bureau of Labor Statistics, Washington, DC.
BLS File of State, County, and Municipal Collective Bargaining Agreements, Spring 1981.
Final rept.
May 81, 116p BLS/AG-FILE-80

The bulletin is the tenth in a series which lists the collective bargaining agreements in State, County and Municipal governments that are on file in the Bureau of Labor Statistics as of Fall 1980. In table 1, agreements for each State are arranged according to State, County, or other jurisdiction. In table 2, agreements of each union are arranged according to jurisdiction. In table 3, agreements are arranged according to expiration date.

PB82-143470 PC **A02**/MF **A01**
Federal Emergency Management Agency, Washington, DC.
Young Children: A New Target for Public Fire Education.
Aug 79, 17p FEMA-01

The booklet describes the techniques and approaches of two early programs to provide public fire education to pre-school children. One program, developed by the Georgia Department of Human Resources, focuses on activities for pre-school caregivers such as fire safety finger plays and songs. The second program, developed by Fire Service Training of Oklahoma State University, utilizes flannel board stories and other activities for pre-schoolers. The booklet also includes suggestions for delivering fire safety information to preschoolers.

PB82-143512 PC **A23**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Student Manual: Industrial Hygiene Chemistry Course. Volume I.
Apr 75, 542p
Contract PHS-CDC-99-74-72
See also PB82-143520.

The lecture material for a course in industrial hygiene chemistry is covered in this volume of the student manual. Topics covered include: direct reading instruments; air flow calibration and sampling; ion selective electrodes; spectrophotometry; colorimetry; atomic absorption spectrometry; chromatography; and biological monitoring.

PB82-143520 PC **A06**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Student Manual: Industrial Hygiene Chemistry Course. Volume II.
Apr 75, 125p
Contract PHS-CDC-99-74-72
See also PB82-143512.

A student manual for an industrial hygiene chemistry course is presented. The manual consists of lessons in standardized format consisting of laboratory cover sheet, special preparation section, laboratory procedures, and figures and forms.

PB82-145350 PC **A11**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Labour Intensive Technology in Water Resources Development--Indian Experience.
Oct 79, 230p PUB-139

India has been bestowed with substantial water resources. The construction of dams and the associated canal systems involving the investment of substantial funds afford an opportunity for providing employment opportunities for a large number of technical, non-technical, skilled and unskilled personnel. This can make a substantial contribution to the reduction in the unemployment situation in the country also in the construction phase. The present publication contains some of the experiences of engineers in the country on adoption of the labor intensive technology on a few water resources development projects.

PB82-145368 PC **A08**/MF **A01**
National Research Council, Washington, DC.
Doctoral Scientists in Oceanography.
Jan 81, 171p ISBN-0-309-03133-8
Library of Congress catalog card no. 80-84934. Sponsored in part by National Science Foundation, Washington, DC.

The report classifies and counts Ph.D. scientists in the United States trained in oceanography, working in oceanography, or both and presents their demography and institutional background. Clear definitions are introduced to avoid problems of ambiguity in dealing with this multi-faceted discipline. The numbers presented are rational estimates based on data available from several sources. The material in the report is arranged to make a complete picture available for the levels of interest.

PB82-145590 PC **A19**/MF **A01**
National Research Council, Washington, DC.
Postdoctoral Appointments and Disappointments.
Mar 81, 428p ISBN-0-309-03132-X
Contract NSF-SRS78-24661
Library of Congress catalog card no. 80-29104.

The report presents detailed findings on a broad range of issues concerning the importance of postdoctorals to the nation's research effort and the value of postdoctoral experience to young scientists and engineers pursuing careers in research. The report identifies as issues of particular concern: (1) the lack of prestige and research independence in postdoctoral appointments for the most talented young people; (2) the mismatch between the important role that postdoctorals play in the nation's research enterprise and the lack of opportunities that they find for subsequent careers in research; (3) the lack of recognized status of postdoctoral appointments in the academic community; and (4) the underutilization of women and members of minority groups in scientific research.

PB82-145905 PC **A13**/MF **A01**
National Research Council, Washington, DC.
Program Evaluation in Education: When, How, to What Ends.
May 81, 287p ISBN-0-309-03143-5
Library of Congress catalog card no. 81-81674.

The National Academy of Sciences was asked by the Office of Education (OE) to undertake a study of program evaluation in education. The purpose of the study was to recommend ways of increasing the effectiveness and usefulness of the OE's evaluation efforts. It was explicit in the request made by OE that the core of the study would be a report by an expert committee. The Committee came to organize the report around four major topic areas: distinguishing between evaluation types and choosing appropriate strategies and procedures; improving the quality of evaluations; increasing the effective use of evaluations; and improving the organization and management of federally funded evaluations in education.

PB82-146101 PC **A20**/MF **A01**
Michigan Univ., Ann Arbor.
Physician Job Satisfaction and Retention in Prison Health Programs.
Executive summary (Final) 1 Mar 80-31 Jul 81,
Richard Lewis Lichtenstein. c1981, 473p NCHSR-82-1
Grant PHS-HS-04127

The study examines the personal and organizational factors associated with physicians' decisions to leave or stay in the prison setting. The conclusion reached is that the factors influencing these decisions, are so diverse that a strategy to increase physician retention in prisons is not feasible.

PB82-146259 PC **A25**/MF **A01**
Columbia Univ., New York. Dept. of Sociology.
Craft Production: Work and Alienation in the Construction Industry.
Final rept.,
Marc L. Silver. May 81, 599p DLETA-91-36-79-02-1
Grant DL-91-36-79-02

The study focuses on the nature of the labor process in the building and construction industry with regard to its organizational structure and the consequences of work and employment for building craftspeople. The research is based on a survey of 250 craftspeople from ten trade unions. The first part of the report is a theoretical discussion of previous research on these issues. The second focuses on the present study of the ten local unions. It describes the organization of work at the point of production and its consequences for the satisfaction and alienation of workers, as well as the importance of managerial position and union-contractor labor relations practices. Findings indicate that autonomy and self-direction in work are not uniform across building trades and are determinants of work alienation. Labor relations tend to reflect contractors' power over local unions, and that craftspeople deal with this by attempting to obtain management positions with contractors.

PB82-149287 PC **A07**/MF **A01**
National Academy of Engineering, Washington, DC.
Educational Technology in Engineering,
Lionel V. Baldwin, and Kenneth S. Down. 1981, 133p ISBN-0-309-03138-9
Library of Congress catalog card no. 81-80333.

The paper reviews the literature and current knowledge on the use of modern technological methods in engineering education with an emphasis on videotape systems. The primary focus is on current practices.

PB82-149493 PC **A07**/MF **A01**
British Library, London (England). Research and Development Dept.
The Teaching of Computer Appreciation and Library Automation,
A. J. Oulton, E. Bishop, A. J. Wood, and J. J. Foster. c1981, 137p BLR/D-5647, ISBN-0-905984-75-7
Also pub. as ISSN-0308-2385.

The report describes an experimental instructional investigation. A course in computers and automation of libraries was added to the curriculum of Manchester Polytechnic as a requirement in Library Science. Attitudes of students are recorded.

PB82-803628 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Aided Instruction. September, 1979-December, 1981 (Citations from the NTIS Data Base).
Jan 82, 345p
Supersedes PB80-814544, and NTIS/PS-79/0941.

Reports on the use of computers in education, and the computer systems necessary, are cited. Studies include motivation, technical training, learning factors, and human factors engineering. (This updated bibliography contains 338 citations, 152 of which are new entries to the previous edition.)

PB82-861089 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Education: Systems Theory Applications. 1975-January, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 82.
Jan 82, 148p

Reports cited in the bibliography cover applications of systems theory to many aspects of education, e.g., planning, administration, operations, and instruction. Various kinds and levels of education are considered. Models and modeling techniques are included. (Contains 156 citations fully indexed and includes a title list.)

PB82-861782 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Equal Employment Opportunity: Legal Aspects. 1974-January, 1982 (Citations from the Management Contents Data Base).
Rept. for 1974-Jan 82.
Jan 82, 185p
Supersedes PB81-861197.

The bibliography covers laws, regulations, and litigations related to Equal Employment Opportunity (EEO). Reports of numerous court decisions are cited as well as reports on some National Labor Relations Board actions. (This updated bibliography contains 270 citations, 17 of which are new entries to the previous edition.)

5J. Psychology (Individual and Group Behavior)

AD-A108 144/7 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Three Short Essays on Decisions, Reasons, and Logics,
Jon Doyle. May 81, 19p Rept no. STAN-CS-81-864
Contract MDA903-80-C-0102

This report collects together three short, survey-level essays introducing related approaches to decision-making, reasoning, and logic. The first essay, Making Difficult Decisions, was read to the Stanford Computer Forum on February 5, 1981. The following two essays, Dependencies and Assumptions (written with Johan de Kleer) and Non-Deductive Reasoning and Non-Monotonic Logics, are versions of articles to appear in the Handbook of Artificial Intelligence (A. Barr, P. Cohen and E. Feigenbaum, eds.). (Author)

AD-A108 178/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
The Scientific Community Metaphor.
Memorandum rept.,
William A. Kornfeld, and Carl Hewitt. 10 Feb 80, 12p Rept no. AI-M-641
Contract N00014-75-C-0522
Pub. in IEEE Transactions on Systems, Man, and Cybernetics, vSMC-11 n1 p24-33 Jan 81.

No abstract available.

AD-A108 190/0 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Computer-Based Education Research Lab.
Indices for Detecting Unusual Item Response Patterns in Personnel Testing: Links between Direct and Item-Response-Theory Approaches.
Research rept.,
Kikumi Tatsuoka, and Robert L. Linn. Aug 81, 46p Rept no. RR-81-5
Contract N00014-79-C-0752

Two distinct approaches, one based on item-response theory and the other based on observed item responses and standard summary statistics, have been proposed to identify unusual response patterns. A link between these two approaches is provided by showing certain correspondences between Sato's S-P Curve Theory and item response theory. This link makes possible several extensions of Sato's caution index that take advantage of the results of item response theory. Several such indices are introduced and their use illustrated by application to a set of achievement test data. Two of the newly introduced extended indices were found to be very effective for purposes of identifying persons who consistently use an erroneous rule in attempting to solve signed-number arithmetic problems. The potential importance of this result is briefly discussed. (Author)

AD-A108 355/9 PC **A03**/MF **A01**
Vanderbilt Univ., Nashville, TN. Dept. of Psychology.
The Primacy of Depth in Visual Perception.
Technical rept.,
Robert Fox. Nov 81, 46p
Contract N00014-81-C-0001
Errata sheet inserted.

This report is a slightly edited version of an invited address (New Fellows Address) given by the writer at the national convention of the American Psychological Association in Los Angeles on August 28, 1981. The implications of several kinds of recent investigations of three-dimensional visual space perception are discussed, including investigations performed by the writer and his colleagues, and summarized in 'Contour Interaction in Visual Space.' The results of all investigations are interpreted as supporting the claim that the X Y Z position of objects in visual space is processed quite early by the visual system. This initial identification of the loci of objects in space serves to control subsequent analysis of the characteristics of those objects. This interpretation supports a general theory of visual space perception that assumes there is an internal, continuous representation of visual space within the visual system. This representation is assumed to be an intrinsic hardwired characteristic of that system. Conversely, support is not given to an alternative general theory of space perception that assumes depth information is processed relatively late in the visual system by an analysis of specific cues to distances, cues which acquire their significance gradually by repeated exposure to the environment.

AD-A108 430/0 PC **A13**/MF **A01**
Air Force Academy, CO.
An Investigation of Mental Coding Mechanisms and Heuristics Used in Electronics Troubleshooting.
Final rept.,
Mark M. Burroughs. Apr 80, 279p Rept no. USAFA-TR-80-8
Doctoral thesis.

This research is comprised of four separate but related efforts, which are: (1) A Review of Troubleshooting Literature; (2) An Outline of a Theoretical Description for a Process Model; (3) A Mental Encoding Experiment Relating to Troubleshooting, and (4) An Experiment on Heuristics Used in Troubleshooting. In all, some 33 publications pertaining to behavioral aspects of troubleshooting were reviewed, in addition to over 60 other papers dealing with mental encoding and with heuristics. A theoretical description of a process model problem space in mathematical terms was developed and outlined quantitatively, using tensor analysis. Next, a heuristical process model, which is the qualitative counterpart of such a mathematical model was described. Finally, a discussion of the relative merits of each model, in view of man's cognitive limitations, was presented.

AD-A108 510/9 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Psychology.
Apparent Size and Visual Accommodation under Day and Night Conditions.
Interim scientific rept.,
Nicholas M. Simonelli, and Stanley N. Roscoe. 1979, 16p ENG-PSY-79-3/AFOSR-79-3, AFOSR-TR-81-0801
Contract F49620-77-C-0117

Six subjects on a building roof viewed the outside terrain through a projection device which superposed a full horizon moon on that view. Subjects judged the size of the moon in various scenery configurations by adjusting a comparison disc while accommodation measurements were taken using a laser optometer. Results showed a strong correlation between mean accommodative states and size judgments during the day and a weaker correlation at night. Accommodation responses were not identical to all scenes and as accommodation shifted inward, the judged size of the moon decreased. 'Night myopia' was also clearly evident. The relatively nearer accommodation responses and smaller size judgments of the isolated zenith-type moon as compared to the horizon moon suggests that the moon illusion is mediated by the accommodation mechanism. The results are discussed in connection with a similar study by Iavecchia, Iavecchia and Roscoe, and differences in the mean 'dark focus' of accommodation between the two groups are related to the findings. (Author)

AD-A108 587/7 PC **A03**/MF **A01**
Colorado Univ. at Boulder. Inst. of Cognitive Science.
Text-Based Decisions: Changes in the Availability of Facts Over Time.
Technical rept. 1 Jan-30 Jun 81,
Steven Antos, Lyle E. Bourne, Jr., and Walter Kintsch. Jul 81, 38p Rept no. ICS-TR-106-ONR
Contract N00014-78-C-0433

Real life decisions and judgments are typically made partly on the basis of memory for information presented at an earlier time but no longer available in memory. For example, while it may be of no special significance, a deeply processed fact could have a greater influence on delayed judgment than another poorly processed fact. In this experiment, certain facts were distinguished during incidental encoding either by repetition or by presentation in concrete (as opposed to abstract) form. These facts were shown to have a disproportionate impact on later judgments in three domains (stock market, medical diagnosis and criminal trial). This judgmental bias appeared to be directly connected to better memory for concrete or repeated facts and independent of any difference in weight or importance of retained facts. The results of this study are interpreted in terms of a theoretical control schema that operates on input (text) so as to fill pre-established slots with decision-specific information. Repetitions and concrete statements provide representations that are more available for retrieval at time of judgment. (Author)

AD-A108 635/4 PC **A03**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Computer Science.
A Theory of Language Acquisition Based on General Learning Principles.
Technical rept.,
John R. Anderson. 17 Jun 81, 28p Rept no. CMU-CS-81-129
Contract N00014-79-C-0661

A simulation model is described for the acquisition of the control of syntax in language generation. This model makes use of general learning principles and general principles of cognition. Language generation is modelled as a problem solving process involving principly the decomposition of a to-be-communicated semantic structure into a hierarchy of subunits for generation. The syntax of the language controls this decomposition. It is shown how a sentence and semantic structure can be compared to infer the decomposition that led to the sentence. The learning processes involve generalizing rules to classes of words, learning by discrimination the various contextual constraints on a rule application, and a strength process which monitors a rule's history of success and failure. This system is shown to apply to the learning of noun declensions in Latin, relative clause constructions in French, and verb auxiliary structures in English. (Author)

AD-A108 655/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Games with Uncertain Models,
David A. Castanon. Nov 81, 17p Rept no. LIDS-P-1163

Contract N00014-77-C-0532
Presented at the 4th MIT/ONR Workshop on C3 Systems, Jun 81, San Diego, CA.

We present a normative decision model for hierarchical organizations whose levels operate at different tempos. We describe the mathematical methodology whereby each level forms internal models of the detailed state process, corresponding to its tempo of operation. Based on these models, we describe a rational aggregate strategy for the hierarchical organization. (Author)

AD-A108 721/2 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign. Engineering-Psychology Research Lab.
Time-Sharing Manual Control and Memory Search: The Joint Effects of Input and Output Modality Competition, Priorities and Control Order.
Technical rept.,
Michael Vidulich, and Christopher D. Wickens. Dec 81, 61p Rept no. EPL-81-4/ONR-81-4
Contract N00014-79-C-0658

This report addresses some of the issues that must be considered as voice recognition and synthesis (VRAS) technology is integrated into complex man-machine system environments. These issues include the input and output channels demanded by competing activities, task difficulty or workload, the allocation of attention and the nature of the task that - spatial or verbal - will be interfaced with VRAS. The present experiment addresses primarily the first three issues within the framework of multiple resource theory. Ten subjects performed first and second order tracking tasks either alone or concurrently with a Sternberg Memory Search Task with a set size of three letters. In different conditions the memory search task was presented either auditorily (A) or visually (V), and responses were executed with either a speech response (S), or manually (M). These generated four input/output combinations: AS, VS, AM, VM, that could be defined in terms of an increasing degree of resource overlap with the VM tracking task.

PB82-141805 PC **A12**/MF **A01**
California Univ., Berkeley. Dept. of Psychology.
Childrens' Survival Skills: A Basis for Functioning in Society.
Final rept. 1 Jan 78-1 Dec 80,
Ditsa Kafry, Jeanne H. Block, and Jack Block. Mar 81, 264p MCH/CCS-81/09
Grant PHS-MC-R-060420

Two aspects of children's functioning in society, acquisition of survival skills and control of noxious behaviors, were studied and related to the characteristics of the children and the characteristics of their environments. Sixty-nine girls and seventy boys from three grade levels (kindergarten, second-grade, and fourth-grade) in public schools of two communities in Northern California and their parents participated in the first phase of the study--an initial home interview. A subsample of 69 children and their parents participated in a second home interview, and 38 parents responded to a telephone interview. Participating children were found to have adequate survival skills for mastery of their immediate environment, a somewhat lower level of knowledge about the world at large, and inadequate skills for dealing with hazardous situations. The acquisition of survival skills was achieved mainly by maternal instruction and by self-teaching through imitation and experimentation. The level of survival skills was found to be related to cognitive-resiliency, to age, and to the quality of the home environment. It was concluded that the two aspects of functioning in society reflect relatively independent domains in the children's lives: survival skills were found to relate to cognitive development, while noxious behaviors were found to relate to deficiencies in the development of appropriate impulse control.

PB82-142035 PC **A11**/MF **A01**
Veterans Administration Hospital, Minneapolis, MN. MMPI Research Lab.
An Atlas for the P-Code System of MMPI Interpretation.
Nov 75, 240p VA/IB-11-50

This atlas is intended to be a reference source for information on the predictive validity of MMPI profile configurations as well as impressions concerning the limits of such validity, for use as a supplement to other methods of profile analysis. It is indexed by test scores starting with test scores or P-codes, D2 type and magnitude, or T-codes, and ascertaining the empirical correlates of such test configuration. The atlas provides a means for comparing all profiles of individual cases having similar profiles not covered by existing codebooks.

PB82-142324 PC **A03**/MF **A01**
Veterans Administration Wadsworth Hospital Center, Los Angeles, CA.
Status of Suicide in Veterans Administration Hospitals: Report IV,
Norman L. Farberow, and John L. Williams. Jan 78, 44p VA/78-5059

This report is part of a continuing series of reports describing the status of suicide in Veterans Administration (VA) hospitals. The first part of the report presents 23 tables of statistics for the three fiscal years 1973 through FY 1975, on rates, demographic characteristics, diagnostic distribution, suicide methods, and suicide sites. The second section presents suggestions for guidelines for prevention of suicide in hospitals. Behavioral manifestation of suicidal patients are described, and methods of safeguarding identified suicidal patients are suggested.

PB82-147968 PC **A03**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
An Organization Development Effort to Improve Group Dynamics in the National Heart, Lung, and Blood Institute Planning Process.
Final rept.,
Luiz Horta Barbosa. Dec 81, 36p 141-80-IX
Sponsored in part by National Heart, Lung, and Blood Inst., Bethesda, MD.

The study examines the application of an Organization Development (OD) intergroup intervention to reduce tension, conflict and dysfunction between the two groups responsible for setting priorities and developing new initiatives related with Blood Diseases and Blood Resources, one of the program areas of the National Heart, Lung, and Blood Institute. It is not uncommon for a significant amount of dysfunctional energy to be spent in competition, misunderstanding, miscommunication, and misperception between groups. This OD intervention focuses on the collaborative inquiry feature of the action research model - a data-based, problem-solving model that replicates the steps involved in the scientific method of inquiry. The rationale, design and application of the action research model is examined in this report, and the overall effectiveness of the approach is discussed.

PB82-803743 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Mental Health Services: Utilization. 1973-December, 1981 (Citations from the NTIS Data Base).
Jan 82, 57p
Supersedes PB80-814569, and NTIS/PS-79/0808.

Selected abstracts are presented on the utilization of mental health services based on community and population characteristics and the availability and accessibility of services. Mental health services include those for alcohol and drug abuse, mental problems of the elderly, mental retardation, and other mental disorders of the population. (This updated bibliography contains 52 citations, 74 of which are new entries to the previous edition.)

5K. Sociology

AD-A108 557/0 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. General Government Div.
More than Money is Needed to Solve Problems Faced by State and Local Corrections Agencies.
23 Sep 81, 44p Rept no. GAO/GGD-81-104

State and local Departments of Corrections are facing serious problems, such as prison overcrowding, dilapidated facilities, poor safety and sanitation conditions in prisons and jails, and the need to provide more adequate services. External factors, such as the public, legislatures, and other components of the criminal justice system, have contributed to this dilemma by placing increased demands on Departments of Corrections without providing the resources needed to handle the extra workload. This staff study uses a case study of over-crowding in Massachusetts to illustrate the effect that external factors can have on Departments of Corrections. It points out that correctional problems will not be resolved unless all of the parties contributing to such problems become involved. It also discusses ways in which the Federal Government might assist, such as paying more attention to the impact that Federal actions have on State and local systems and providing increased technical assistance. (Author)

HRP-0903789/6 PC **A03**/MF **A01**
Agassiz Health Systems Agency, Grand Forks, ND.
Developmental Disabilities Issue Paper.
Jan 81, 43p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.Portions of this document are not fully legible.

The problems in analyzing development disabilities (DD) service needs in the Agassiz health service area are presented. (1) Limited information is available on the DD population. (2) The service inventories provide limited information on the number of DD persons served. (3) The appropriate roles of state, Federal, and county government have never been clearly delineated. (4) Readily available cost information is lacking. The planning and review process should affirm the principles of normalization, least restrictive environment, individual program planning, interdisciplinary approach, and continuum of care. Recommendations are made based on these principles.

PB82-138330 PC **A09**/MF **A01**
Indiana Univ. at Bloomington.
Surveying Citizens for Police Performance Assessments,
Roger B. Parks. Nov 80, 179p NSF/RA-800610
Grant NSF-GI-43949

Surveys are shown to be useful in measuring crime occurrence and distribution, citizen fear of crime, citizen investment in protection, police activity, and police response to reported victimization. The three types of surveys used to study crime and the police are (1) victimization surveys, which estimate the frequency of different crimes in a population; (2) client or consumer surveys, which determine the character of contacts between citizens and police; and (3) general population surveys, which estimate phenomena among a population in specified areas. Citizen survey data may be used for basic research purposes, for providing feedback to local police agencies, or for comparative performance assessments. The problems with conventional data are addressed and external influences on police data are noted. Results of surveys taken in 1970 in Chicago and Indianapolis are presented and compared. Results are also presented of a 1972 survey in St. Louis and a 1977 police services study in 60 residential neighborhoods located in Rochester, St. Louis, and Tampa-St. Petersburg. Difficulties with citizen surveys are noted.

PB82-139114 PC **A05**/MF **A01**
Economics Research Associates, San Francisco, CA.
Fees and Charges Handbook: Guidelines for Recreation and Heritage Conservation Agencies.
Mar 79, 86p NSF/RA-790755
Grant NSF-DAR76-19341
Sponsored in part by Heritage Conservation and Recreation Service, Washington, DC.

This handbook explains how fees and charges can be used to increase self-sufficiency of public agencies or nonprofit organizations in providing leisure services and heritage protection. Discussed are (1) the benefits and issues which face agencies and organizations considering a new or expanded fee program; (2) the positive and/or negative impacts which might result from fees and charges; (3) a procedure for assessing the feasibility of imposing new fees or changing existing fees; and (4) considerations for implementing fee programs. The described feasibility analysis is applied to a hypothetical tennis center that has requested an increase in use fees for regular tennis play.

PB82-139643 PC **E05**/MF **E05**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Migration and Settlement: 10. Austria.
Final rept.,

Michael Sauberer. c1981, 122p RR-81-16, ISBN-3-7045-0012-7
See also PB81-159988.

This report is part of a comparative analysis of national patterns of interregional migration and spatial population growth carried out by an international network of scholars who are using methodology and computer programs developed at IIASA. In this report, Dr. Michael Sauberer, Director of the Austrian Institute for Regional Planning, shows how multiregional population analysis may be used to describe and analyze the changes taking place in the size and distribution of populations over time, with special reference to Austria. Adopting a two-level multiregional system (nine provinces and four regions) for the study, the author demonstrates that it is important to consider the interdependence between the provinces when studying populations at the subnational level.

PB82-140799 PC **A13**/MF **A01**
Indiana Univ. at Bloomington.
Assessing the Influence of Organization on Performance: A Study of Police Services in Residential Neighborhoods,
Roger B. Parks. Jul 79, 287p T-75, NSF/RA-790738
Grants NSF-GI-43949, R01-HM-19911

Data from two recent studies of police service delivery were used to examine linkages of structure, conduct, and performance. The first study explored data on service delivery structures, organizational arrangements, production strategies, and police activities in 80 metropolitan areas across the United States. The second study supplied data on organizational arrangements and production strategies among a sample of police departments in a single metropolitan area. Data was also supplied on the activities of officers from departments in a set of matched residential neighborhoods. Analyses using these data focused on several key areas. Service delivery structures and organizational arrangements were related to production strategies and to the availability of patrol and specialized officers in police jurisdictions. Patrol officer availability was related to patrol presence, police response capabilities, and citizens' perceptions of police capabilities to respond when called. Both response time distributions and the distributions of police responses to victimizations other than immediate response were shown to be related to the production strategies of police departments.

PB82-141144 PC **A10**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1974-79. Volume 1: Summary.
Jun 81, 209p BEA-REM-81-01
See also Volume 2, PB82-141151.
Also available in set of 9 reports PC E99, PB82-141136.

The report includes methodology and classification of SMSA's and BEA Economic Areas. It shows total and per capita personal income by place of residence, personal income by type of payment, and labor and proprietors' income by major industry and place of work. Data is shown for all States, BEA Economic Areas, and Standard Metropolitan Statistical Areas.

PB82-141151 PC **A04**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1974-79. Volume 2: New England Region.
Jun 81, 57p BEA-REM-81-02
See also Volume 1, PB82-141144, and Volume 3, PB82-141169.
Also available in set of 9 reports PC E99, PB82-141136.

The report includes a summary methodology. It shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the New England Region: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

PB82-141169 PC **A05**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1974-79. Volume 3: Mideast Region.
Jun 81, 91p BEA-REM-81-03
See also Volume 2, PB82-141151, and Volume 4, PB82-141177.
Also available in set of 9 reports PC E99, PB82-141136.

The report includes a summary methodology. It shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Mideast Region: Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania.

PB82-141177 PC **A08**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1974-79. Volume 4: Great Lakes Region.
Jun 81, 157p BEA-REM-81-04
See also Volume 3, PB82-141169, and Volume 5, PB82-141185.
Also available in set of 9 reports PC E99, PB82-141136.

The report includes a summary methodology. It shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Great Lakes Region: Illinois, Indiana, Michigan, Ohio, and Wisconsin.

PB82-141185 PC **A09**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1974-79. Volume 5: Plains Region.
Jun 81, 198p BEA-REM-81-05
See also Volume 4, PB82-141177, and Volume 6, PB82-141193.
Also available in set of 9 reports PC E99, PB82-141136.

The report includes a summary methodology. It shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Plains Region: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

PB82-141193 PC **A15**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1974-79. Volme 6: Southeast Region.
Jun 81, 336p BEA-REM-81-06
See also Volume 5, PB82-141185, and Volume 7, PB82-141201.
Also available in set of 9 reports PC E99, PB82-141136.

The report includes a summary methodology. It shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Southeast Region: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.

PB82-141201 PC **A07**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1974-79. Volume 7: Southwest Region.
Jun 81, 133p BEA-REM-81-07
See also PB81-105215, Volume 6, PB82-141193, and Volume 8, PB81-141219.
Also available in set of 9 reports PC E99, PB82-141136.

The report includes a summary methodology. It shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Southwest Region: Arizona, New Mexico, Oklahoma, and Texas.

PB82-141219 PC **A05**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1974-79. Volume 8: Rocky Mountain Region.
Jun 81, 89p BEA-REM-81-08
See also Volume 7, PB82-141201, and Volume 9, PB82-141227.
Also available in set of 9 reports PC E99, PB82-141136.

The report includes a summary methodology. It shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in the Rocky Mountan Region: Colorado, Idaho, Montana, Utah, and Wyoming.

PB82-141227 PC **A05**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1974-79. Volume 9: Far West Region, Including Alaska and Hawaii.
Jun 81, 88p BEA-REM-81-09
See also PB81-105231, and Volume 8, PB82-141219.
Also available in set of 9 reports PC E99, PB82-141136.

The report includes a summary methodology. It shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data is shown for counties and Standard Metropolitan Statistical Areas in Alaska, Hawaii, and the Far West Region: California, Nevada, Oregon, and Washington.

PB82-141557 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
Social Justice through Handicapped Power: Perspectives from England and Sweden.
Final rept.,
G. D. Carnes. Apr 81, 56p VA/81-5055
Grant PHS-22-P-59032/2-02
Prepared in cooperation with Truman Memorial Veterans Hospital, Columbia, MO.

The purpose of this study was to visit the United Kingdom and Sweden to investigate the degree of evolution of organizations of and for the handicapped, and to identify factors responsible for their development. Numero's groups are described, including voluntary organizations, governmental advisory groups, and special purpose organizations. The problems faced by the groups are also described. The evolution of organizations involving disabled persons is discussed, using Swedish groups as the example of a highly developed and coordinated system. The Central Committee of National Associations of the Handicapped (HCK) is described in detail, and 23 member groups and addresses are listed in an appendix.

PB82-143124 PC **A09**/MF **A01**
Human Services Inst., Inc., of Montgomery County, PA.
Human Services Transportation Coordination Study, 1980.
Technical study.
1980, 200p UMTA-IT-09-0093-81-1
Contract UMTA-IT-09-0093

The study was initiated on behalf of the Montgomery County, Pennsylvania Planning Commission on May 1, 1978. A major impetus for this study was the realization that the rapid growth of human services transportatin in the County was resulting in significant expenditues of manpower, money, and equipment, but with an apparent lack of the kind of system cohesion normally associated with such growth. It became obvious that there was need for an overview of the state of human services transportation in the County in preparation for the development of an appropriate planning perspective. This study focuses on an assessment and analysis of the transportation resources of sixty human service agencies which provide programs to the youth, aged, and handicapped of the County. The basic purposes of this study were to: (1) understand and assess the strengths and weaknesses of the County's present human services transportation network; (2) analyze these strengths and weaknesses; and (3) present findings and recommendations directed at improving the current system where indicated.

PB82-144007 Not available NTIS
National Bureau of Standards, Washington, DC.

A Laboratory Flammability Test for Institutional Mattresses.
Final rept.,
Vytenis Babrauskas. Nov 81, 6p
Pub. in Fire Jnl. 75, n6 p35-40 Nov 81.

Minimum mattress fire safety is provided by the mandatory Federal cigarette ignition standard FF 4-72. This is generally considered not to be sufficient for the jail or prison environment where flaming ignitions can well be expected and egress may be restricted. Until now additional safety could only be provided by either explicitiy banning certain materials or else requiring full-scale demonstration tests. The former discourages innovation while the latter is difficult to control and reproduce. To eliminate these difficulties, a set of benchscale laboratory test procedures has been developed for testing mattresses and classifying their performance. A program of full-scale fire testing identified four distinct performance groups. The laboratory test procedures correctly classify the performance into the same groups as the full-scale fire tests. For general use in correctional facilities only mattresses conforming to the highest group requirements (Group A) are recommended. The same test procedure is also applicable to cell padding materials.

PB82-145749 PC **A06**/MF **A01**
Politecnico di Torino (Italy). Facolta di Architettura.
Barrier-Free Housing,
Amanda Bruno, and Silvana Tron. Apr 80, 105p
Trans. of mono. L'alloggio Senza Barriere, n.p., n.d.

The report is aimed at solving the problems of people with serious or permanent infirmities, although not always considered as disabled. Its purpose is to increase the opportunities for participation and involvement of those persons in daily routines. The understanding and effects of maladies are considered in the first part of the report. In the second part, a discussion of methods to be used is taken up.

PB82-145756 PC **A06**/MF **A01**
Academy for Contemporary Problems, Washington, DC.
Long-Term Recovery from Natural Disasters: A Comparative Analysis of Six Local Experiences,
Claire B. Rubin. Sep 81, 122p NSF/CEE-81053
Grant NSF-PFR79-24999

A comparative analysis is presented of six studies of local experience with long-term recovery from natural disasters. It was found that the primary determinant of expeditious, effective recovery was prior experience with the same or a similar disaster agent. A related, secondary determinant was a continuing relationship with the state and Federal government. For the most part, prior disaster experience led to greater knowledge and application of mitigation measures. Specific areas that deserve closer attention in future case studies are city-county relationships; interaction of local public and business leaders; and the role of citizen activist groups.

PB82-145764 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Natural Hazards Research and Applications Information Center.
Natural Hazards Observer. Volume 6, Number 1, September 1981.
Sep 81, 14p NSF/CEE-81071
Grant NSF-ENV76-05682

This issue contains brief articles and publications announcements covering the following topics: natural hazards reduction; the Sixth Annual Hazards Workshop, including lists of research summaries, presentations, hazards programs abstracts and session summaries; the discontinuation of the Great Lakes Communicator; earthquake prediction in Peru; hurricane relocation planning for Texas counties; hurricane message enhancement; flood preparedness visual aids; mental health planning for disaster victims; a drought response plan; and community response to earthquake threat in Southern California. Announcements of national and international conferences, symposia, and workshops to be held are listed as well as the availability of recent publications. Descriptions of newly awarded grants involve the role of the black media in disasters; cooperative hazards research; hazard abatement ordinances for existing buildings; reducing the vulnerability of cultural objects to natural hazards; and problems in formulating disaster relief.

PB82-145772 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Natural Hazards Research and Applications Information Center.
Natural Hazards Observer. Volume 5, Number 3, March 1981.
Mar 81, 17p NSF/CEE-81069
Grant NSF-ENV76-05682
See also Volume 5, Number 1, PB81-166563.

This issue contains brief articles and publications announcements covering the following topics: a post-flood interagency agreement; the 1983 Krakatoa earthquake; tsunamis; peak flood flows in San Diego's Mission Valley, 1978-80; disaster survival skills; a lightning victim survey; economic effects of the Mt. St. Helens eruptions; recovery planning; flood management; heatwave deaths; and consequences and planning for a predicted California earthquake. Announcements of national and international conferences, symposia, and workshops to be held are listed as well as the availability of recent publications. Descriptions of newly awarded grants involve geologic hazards from coal mining; disaster assistance information; tsunami risk; seismic safety policy; training for local officials; earthquake prediction; and the role of science and technology in emergency management.

PB82-145780 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Natural Hazards Research and Applications Information Center.
Natural Hazards Observer. Volume 5, Number 4, June 1981.
Jun 81, 18p NSF/CEE-81070
Grant NSF-ENV76-05682

This issue contains brief articles and publications announcements covering the following topics: drought in the Great Plains; land-use maps; an earthquake study of Kansas; retrenching in the flood plain; flash floods in Southern California; flood preparedness; dissemination of disaster-related research; environment problems and planning in Canada; hazards analysis and emergency management in New England; the value of earthquake hazards information; and corporate preparedness. Announcements of national and international conferences, symposia, and workshops to be held are listed as well as the availability of recent publications. Descriptions of newly awarded grants involve earthquake risk; hazard warnings and minority groups; earthquake preparedness; climate impact; mental health of victims affected by Mt. St. Helens eruption; earthquake maps; planning for flood damage mitigation; the role of states in earthquakes and hazards mitigation; and earthquakes and the economy.

PB82-145947 PC **A12**/MF **A01**
National Research Council, Washington, DC. Committee on National Statistics.
Estimating Population and Income of Small Areas.
Dec 80, 264p ISBN-0-309-03096-X
Library of Congress catalog card no. 80-26012. Sponsored in part by Bureau of the Census, Washington, DC.

The objective of the Census Bureau's postcensal estimation program is to update the census information on population and per capita income for approximately 39,000 general purpose governmental units, more than half of which have populations of less than 1,000. The preparation of postcensal estimates for those many small areas was prompted by the State and Local Fiscal Assistance Act of 1972, which required the the most recently available data on population and per capita income provided by the Census Bureau be used in the formulas that determine the annual (or biannual) allocation of general revenue sharing (GRS) funds among 39,000 eligible units of government. In addition to their use in determining the allocation of GRS and other federal assistance funds--a total of more than $36 billion per year--these estimates also serve a wide variety of needs of state and local governments, private organizations, and scholarly research.

PB82-147372 PC **A10**/MF **A01**
National Inst. on Drug Abuse, Rockville, MD. Div. of Research.
Young Men and Drugs in Manhattan: A Causal Analysis,
Richard R. Clayton, and Harwin L. Voss. Sep 81, 210p DHEW/PUB/ADM-81/1167, RESEARCH MONO SER-39
Sponsored in part by National Clearinghouse for Drug Abuse Information, Rockville, MD.

The report examines the etiology and natural history of drug use with a special focus on heroin. One element of the study is a composite index of illicit drug use, the Lifetime Drug Use Index, constructed to reflect the extent and frequency of use of various substances. It is easy to construct and based on types of information usually obtained in surveys of drug use. Other chapters deal with lifetime prevalence and its correlates, incidence and the drug epidemic, predictors of illicit drug use, and causal models to explain illicit drug use. The technique of path analysis was used to test causal models derived from theories of deviance; selling drugs emerged as the key variable. It is indicated that marijuana may be the key gateway drug for understanding multiple drug use and that use of heroin is strongly correlated with extent of use of marijuana. (In the Manhattan sample, percentage of heroin users ranged from 1% of men who had never used marijuana to 56% of those who had used marijuana 1000 or more times). The concluding chapter seeks a theoretical synthesis of causative forces in drug abuse.

PB82-147935 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Natural Hazards Research and Applications Information Center.
Natural Hazards Observer. Volume 6, Number 2, November 1981.
Nov 81, 14p NSF/CEE-81072
Grant NSF-ENV76-05682
See also Volume 5, Number 1, PB81-166563.

This issue contains brief articles and publications announcements covering the following topics: mental health services to disaster victims; a new topographic map of Mount St. Helens, seismicity maps of eastern states, and a hydrologic unit map of the United States; an award for environmental and resource planning in the San Francisco Bay region; social science disaster research; state emergency legislation, organization, vulnerability analyses, and management programs; interstate flood plains problems; a small-town response to disaster; and local disaster management. Announcements of national and international conferences, symposia, and workshops to be held are listed as well as the availability of recent publications. Descriptions of newly awarded grants involve earthquake insurance; earthquake engineering research; computer models for flood insurance studies; a post-event investigation of natural disasters; and mud flows and coastal flooding in regard to the National Flood Insurance Program.

PB82-148198 PC **A07**/MF **A01**
National Inst. on Drug Abuse, Rockville, MD. Div. of Research.
Drug Abuse and the American Adolescent,
Dan J. Lettieri, and Jacqueline P. Ludford. Dec 81, 142p DHEW/PUB/ADM-81/1166, RESEARCH MONO SER-38

The report is a brief (139 printed pages) review of current knowledge in six areas related to drug abuse among American adolescents, with recommendations for future research. Ten contributing authorities cover the epidemiology of adolescent drug use, personality and sociodemographic factors, the influence of family and peers, the relationship between delinquency and drug use, and the biomedical consequences of using drugs during adolescence. Included are an overview, a summary, discussion by several experts, and an itemized list of challenges still to be explored. Numerous references to the existing literature.

PB82-149220 PC **A11**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
A Study of Compensation of Property Management in FmHA Multiple Family Housing: Recommended Guidelines, Standards, and Criteria.
Final rept.,
William F. Daniel. Dec 81, 245p 135-80-VIII
Sponsored in part by Farmers Home Administration, Washington, DC.

The project is a study of guidance need and method for compensation of Property Management in Multiple Family Housing financed by Farmers Home Administration (FmHA). The primary objective is to provide standards, guidelines, and measurable criteria for improved Multiple Family Housing program administration. Survey questionnaires were used to obtain the primary data and information for this study. Personnel of FmHA's State Offices and its National Office participated in one phase of the survey. Selected property managers engaged in managing rental housing projects financed by various lenders including FmHA, participated in a second phase. Available literature and

personal interviews were utilized and cited in the study. The findings in this study indicate FmHA should provide guidelines, standards and criteria for improved administration of its Multiple Family Housing program. The report includes recommended guidelines, standards, and criteria.

PB82-155961 PC **A12**/MF **A01**
National Conference on Social Welfare, Washington, DC.
Case Management: State of the Art.
Final rept.
15 Apr 81, 256p SHR-0008525
Grant PHS-54-P-71542-3-01
Sponsored in part by Administration on Developmental Disabilities, Washington, DC.

The report provides an overview of current case management knowledge for Developmental Disabilities State Planning Councils and other decision makers. The document attempts to capture the complexity inherent in using case management as a tool for assisting persons with developmental disabilities in gaining access to social, medical, educational, and other services. In the first section, the proceedings from a National Case Management Conference held October 21-23, 1980, in Indianapolis are summarized. At its conclusion, conferees stressed the need for defining the client group served and its needs, the consequences of incorporating a new process into the delivery system, and the advisability of involving clients and their families in a flexible case management system. Other issues of interest included value issues inherent in case management, the importance of evaluation, training issues, ethical behavior and personal supports of case managers, and the use of computers. To be effective, case management should be one component in a delivery system that also features a synergistic administrative structure, an adequate inventory of service resources, and supporting mechanisms for needs assessment. The principal issues in case management are raised in a series of six position papers contained in the second section.

PB82-861097 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Demography: Systems Theory Applications. 1975-January, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 82.
Jan 82, 96p

The bibliography cites reports on the use of systems theory in analyses and simulations of demographic parameters characterizing human populations. Various distributions, properties, behaviors, and determinants of these populations are considered. (Contains 91 citations fully indexed and includes a title list.)

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A108 214/8 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Purification of Commercially Prepared Bovine Trypsin by Reverse Phase High Performance Liquid Chromatography,
M. Patricia Strickler, M. Judith Gemski, and Bhupendra P. Doctor. 1981, 12p
Pub. in Jnl. of Liquid Chromatography, v4 n10 p1765-1775 1981.

No abstract available.

AD-A108 289/0 PC **A05**/MF **A01**
Hahnemann Medical Coll. and Hospital, Philadelphia, PA. Dept. of Biological Chemistry.
Studies of Membrane Associated Energy Transduction Mechanisms in Pathological States: Chemical and Biochemical Studies of PGB sub x.
Annual rept. no. 3, 1 Sep 80-30 Aug 81,
Thomas M. Devlin. 30 Aug 81, 100p
Contract N00014-77-C-0340

PGBx, a derivative of 15-keto prostaglandin B1, protects oxidative phosphorylation in isolated mitochondria and tissues during ischemic insult. These unique activities suggest a potential therapeutic role for PGBx. The principal components of PGBx samples are oligomers containing 4 to 8 monomers of the 15-keto PGB1, but impurities formed during the hydroxide catalyzed oligomerization process are also present and difficult to remove. This program is responsible for the synthesis and purification of PGBx, testing samples, and studies of its in vitro and in vivo activity. Different procedures, including gel filtration, electro-focusing and chromatography have been evaluated to purify PGBx prepared in this laboratory and to determine if a separation of the different biological activities of the stock material can be achieved. C13-NMR studies indicate that PGBx is a simple oligomer with bonding between the chains. PGBx protects isolated rat hearts from damage during periods of hypoxia. These results demonstrate the unique pharmacological properties of PGBx and suggest its value in protecting tissues against hypoxia.

AD-A108 568/7 PC **A02**/MF **A01**
Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
Studies on the Mechanism of Action of the in vitro PGBx Effect. I. Composition of Reaction Medium of PGBx Effect.
Phase rept.,
Herman W. Shmukler, M. G. Zawryt, and E. Soffer. 4 Sep 81, 25p Rept no. NADC-81223-60

The mechanism of action of PGBx in Rat Liver Mitochondria (RLM) oxidative phosphorylation was studied by determining the necessity of each component of the reaction medium. These components maybe classified as essential, e.g. Pi, Mg(++), phosphate acceptor and oxidizeable substrate, or non-essential, e.g. KCL and BSA. Although the phosphate acceptor was an absolute requirement for the PGBx effect, all adenine nucleotides, singly or in combination, as well as the glucose-ADP-hexokinase system were satisfactory. Of the oxidizeable substrates tested using the experimental conditions described here, only two did not give positive PGBx effects: Beta-hydroxybutyrate and externally reduced NAD. In addition, the PGBx effect can only be demonstrated with isolated mitochondria exposed to hypotonic conditions at 27 C for a time period that will reduce the phosphorylation level to about 5% of that obtained with undegraded mitochondria. (Author)

AD-A108 661/0 PC **A03**/MF **A01**
Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
Studies on the Mechanism of Action of the In Vitro PGB(x) Effect. II. Reaction Medium Component Requirements for PGB(x) Effect.
Phase rept.,
H. W. Shmukler, M. G. Zawryt, and E. Soffer. 1 Sep 81, 30p Rept no. NADC-81229-60
See also AD-A108 568.

The in vitro system for the assay of the PGBx effect was investigated by exposing rat liver mitochondria (RLM) to the individual components of the normal system, as well as to all possible binary mixtures of these constituents. The degree of degradation, as measured by the decrease in absorbance at lambda 525nm, was compared with the ability of RLM to carry out oxidative phosphorylation. The results indicate there is no correlation between the PGBx effect and the effect of PGBx on the swelling of RLM.

PB82-143637 PC **A08**/MF **A01**
Technische Univ., Brunswick (Germany, F.R.). Naturwissenschaftliche Fakultaet (1).
Isoleucyl-tRNA Synthetase from Baker's Yeast. Interactions between the Free Enzyme and the Enzyme Complexated with Transfer-RNA, and Isoleucine (Isoleucyl-tRNA Synthetase aus Baeckerhefe. Wechselwirkungen des Freien und mit Transfer-RNA Komplexierten Enzyms mit ATP und Isoleucin),
Gunter Wehmeyer. 24 Oct 80, 158p
Text in German.

Studies were carried out to establish the effects of the interaction between the transfer ribonucleic acid (tRNA) and the enzyme in terms of the binding of the low-molecular substrates adenosine-5'-triphosphate (ATP) and isoleucine, as well as the catalytic functions of this enzyme. For these studies, a method was developed for the isolation of the isoleucyl-tRNA synthetase from baker's yeast (including an 11-step purification procedure involving, among others, polyamine precipitation; salting-out; DEAE-cellulose, and CM-Sephadex chromatography; and ammonium-sulfate precipitation). The isoleucyl-tRNA synthetase was characterized by reduction with mercaptoethanol, determination of the specific absorption, determination of the molecular weight, and determination of the K(m) values. There was evidence of sequential substrate addition (ATP first, followed by isoleucine) to the enzyme-tRNA complex. Each intact enzyme molecule catalyzed the reaction only once, ATP hydrolysis was also evident in the absence of isoleucine. The rate of the isoleucine-dependent ATP/PP(i) exchange (turnover coefficient 220/min) increased if saturation-concentration amounts of tRNA-C-C-A and tRNA-C-C-2'dA were added. The presence of tRNA-C-C had no effect. There was a tRNA-dependent discrimination of a non-specific amino acid at the level of the ATP/PP(i) exchange. The dissertation cites 134 references to the literature.

PB82-861667 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Algal Lipids and Steroids. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for 1978-Jan 82.
Jan 82, 167p
Supersedes PB81-852923.

This bibliography contains citations concerning the occurrence, composition, and biosynthesis of lipids and steroids in red, brown, and blue-green marine and fresh water algae. Particular emphasis is placed on the halogenated metabolites and the production of natural products. (This updated bibliography contains 157 citations, 31 of which are new entries to the previous edition.)

PB82-861774 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biodegradation of Cellulose and Lignin. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for 1978-Jan 82.
Jan 82, 153p
Supersedes PB81-861171.

This bibliography contains citations concerning methods and processes for the biodegradation of waste cellulose, cellulose-containing substances, lignin, and lignin-containing substances. Attention is also given to biodegradation mechanisms and their effects on crops and soils. Methods for studying these effects are considered. (This updated bibliography contains 135 citations, 44 of which are new entries to the previous edition.)

PB82-861873 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biomembranes: Biochemistry and Physical Chemistry. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for 1978-Jan 82.
Jan 82, 68p
Supersedes PB81-861742.

This bibliography contains citations concerning the biochemistry and physical chemistry of biomembranes. The effects of temperature, pH, and ionic strength of buffers are discussed. Also considered are studies of ion-transport, radiation dose-rate effects and energy transduction across biomembranes. (This updated bibliography contains 58 citations, 13 of which are new entries to the previous edition.)

PB82-861980 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Group 6A—Biochemistry

Nitrogen Fixation in Agriculture and Aquaculture. 1970-January, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 82.
Jan 82, 154p
Supersedes PB81-861726.

This bibliography contains citations concerning nitrogen-fixation and its impact on future resources. Nitrogen-fixation in terrestrial and aquatic ecosystems are discussed and its importance in terms of 'recycling' is stressed. The nitrogen-fixing legumes, bacteria and blue-green algae are considered and methodology for the study of the biochemistry of nitrogen- fixation is included. (This updated bibliography contains 111 citations, 10 of which are new entries to the previous edition.)

6B. Bioengineering

PB82-143942 Not available NTIS
National Bureau of Standards, Washington, DC.
A High-Power Dual Six-Port Automatic Network Analyzer for Determining Biological Effects of RF and Microwave Radiation.
Final rept.,
C. A. Hoer. 1981, 3p
Pub. in Proceedings of IEEE MTT-S International Microwave Symposium (1981), Los Angeles, California, June 15-19, 1981, Paper in IEEE MTT-S International Microwave Symposium Digest, IEEE Cat. No. 81CH1592-5, p157-159.

The design, calibration and performance of a high-power (1 to 1000W) automatic network analyzer based on the six-port concept are described for the 10 to 100 MHz range.

6C. Biology

AD-A108 284/1 PC **A06**/MF **A01**
Tetra Tech, Inc., Bellevue, WA.
Phytoplankton-Environmental Interactions in Reservoirs. Volume II. Discussion of Workshop Papers and Open Literature.
Final rept.,
Marc W. Lorenzen, Donald B. Porcella, and Thomas M. Grieb. Sep 81, 109p WES-TR-E-81 13-VOL-2
Contract DACW39-78-C-0088
See also Volume 1, AD-A108 019.

This document represents a supplement to the Proceedings of the Workshop on Phytoplankton-Environmental Interactions in Reservoirs. The supplement is an attempt to provide a more general perspective and interpretation of present knowledge about phytoplankton behavior in reservoirs and to discuss techniques for reservoir study. A major emphasis of the project was to relate problems and processes to the current state of the art in reservoir modeling. For this reason the last part of Chapter IV is devoted to a summary of formulations used in current models. The workshop and proceedings were not intended to provide an exhaustive review and in many cases provide citations to other sources of information. Undated references in this volume refer to papers contained in the workshop proceedings. (Author)

AD-A108 596/8 PC **A02**/MF **A01**
Army Medical Bioengineering Research and Development Lab., Fort Detrick, MD.
Hatching States of Eggs of Snow-Melt Aedes.
Final rept. Jan 76-Jul 77,
James T. Kardatzke. 1981, 9p
Pub. in Mosquito News, v41 n3 p502-508 Sep 81.

No abstract available.

ORNL/TM-6791 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Some Sensitivity Studies of Chemical Transport Simulated in Models of the Soil-Plant-Litter System.
C. L. Begovich, and R. J. Luxmoore. Sep 79, 107p
Contract W-7405-ENG-26

Fifteen parameters in a set of five coupled models describing carbon, water, and chemical dynamics in the soil-plant-litter system were varied in a sensitivity analysis of model response. Results are presented for chemical distribution in the components of soil, plants, and litter along with selected responses of biomass, internal chemical transport (xylem and phloem pathways), and chemical uptake. Response and sensitivity coefficients are presented for up to 102 model outputs in an appendix. Two soil properties (chemical distribution coefficient and chemical solubility) and three plant properties (leaf chemical permeability, cuticle thickness, and root chemical conductivity) had the greatest influence on chemical transport in the soil-plant-litter system under the conditions examined. Pollutant gas uptake (SO sub 2) increased with change in plant properties that increased plant growth. Heavy metal dynamics in litter responded to plant properties (phloem resistance, respiration characteristics) which induced changes in the chemical cycling to the litter system. Some of the SO sub 2 and heavy metal responses were not expected but became apparent through the modeling analysis. (ERA citation 05:003653)

PAT-APPL-6-290 540 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Method for Sampling Flying Insect Populations Using Low-Frequency Sound. Detecting and Ranging in Conjunction with a Biologically Active Chemical/Pheromone.
Patent Application,
D. E. Hendricks. Filed 6 Aug 81, 15p PB82-148602
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The purpose in this work is to provide a low power, battery operated SODAR transceiver device sensitive enough to detect and count flying moths lured by sex attractant dispensed at the sonic transmission site. The instant invention comprises the following steps: (1) baiting an agricultural area with a pheromone specific to a flying insect species; (2) luring said flying insect into range of a sound detecting transceiver by means of said pheromone; (3) transmitting a low-frequency sound wave into contact with said flying insect; (4) receiving said sound wave back into a recorder thus producing a detection of said insect; (5) recording the sound waves over a period of time to produce a sampling means for determining flying insect populations.

PB82-143645 PC **A09**/MF **A01**
Technische Univ., Brunswick (Germany, F.R.). Naturwissenschaftliche Fakultaet (1).
Contributions to the Ontogenesis of the Flying and Maneuvering Ability of the Domestic Pigeon (Columba livia var. Domestica) (Beitraege zue Ontogenese der Flug- und Manoevrierfaehigkeit der Haustaube (Columba livia var. Domestica)),
Norbert Krischke. 10 Feb 81, 192p
Text in German.

Studies were carried out to establish whether adaptive modifications contribute to the ability of young pigeons learning and improving their flying capability in addition to maturative and growth modifications. Test pigeons were given the opportunity of experiencing various flying situations, and their flying capability was periodically examined and compared with the aid of slow-motion pictures. Even those pigeons which were kept in small cages acquired the basic motoric flying patterns; however, those which had wing restrictions during maturation were less proficient than those without such restrictions. Pigeons which started to fly at a younger age flew better than those which restricted their early flying to a small area. It appears that experience enables the pigeons to utilize their flying equipment faster and more effectively, especially if the experience was acquired before the 42nd day of life. To some extent, experience improves the flying skills even in older pigeons. The findings contradict earlier reports according to which pigeons start out with a basic flying ability and do not acquire new capabilities by experience. Learning processes definitely play a role during ontological development. The dissertation cites 96 references to the literature.

PB82-143876 PC **A10**/MF **A01**
Academy of Natural Sciences of Philadelphia, Benedict, MD. Benedict Estuarine Research Lab.
Benthic and Fish Studies to Assess Thermal Impacts of the H. A. Wagner Steam Electric Station, Patapsco River, Maryland, 1980-1981.
Final rept.,
Kenneth L. Heck, Richard J. Horwitz, Michael F. Hirshfield, and Howard Hixson. 13 Nov 81, 202p 81-24F, PPSP-W-81-1

Studies to assess possible impacts of heated discharges from the H.A. Wagner Steam Electric Station (SES) upon local infauna, fish and blue crabs of the lower Patapsco River were conducted from July 1980 through June 1981. Data from physico-chemical studies were used in the interpretation of biological studies. Infauna, collected bimonthly primarily with a Smith-McIntyre dredge, showed little evidence that either abundance or species composition had been influenced by the Wagner SES. Statistical analysis of the distributions of the five most abundant species reveals that the H.A. Wagner SES generally attracted fish.

PB82-145129 PC **A04**/MF **A01**
Bureau of Reclamation, Denver, CO. Engineering and Research Center.
Results of Fisheries Investigations at Twin Lakes, Colorado, 1973-76,
L. M. Finnell. Aug 81, 57p REC-ERC-80-5
Prepared in cooperation with Colorado Div. of Wildlife, Denver.

Research was conducted at Twin Lakes near Leadville, Colorado, during 1973-1976 to estimate fishermen use and harvest of both naturally reproduced lake trout, and stocked creel-sized rainbow trout; and to document relative abundance and spatial distribution of lake trout and opossum shrimp (Mysis relicta). This report is one of a series presenting documentation of the ecological conditions of Twin Lakes, Colorado, prior to operation of the Mt. Elbert Pumped-Storage Powerplant.

PB82-145178 PC **A13**/MF **A01**
Rhode Island Univ., Kingston. Graduate School of Oceanography.
Development of Techniques and Methodology for the Laboratory Culture of Striped Bass, 'Morone saxatilis' (Walbaum).
Final rept. Jul 73-Jun 78,
Bruce A. Rogers, Deborah T. Westin, and Saul B. Saila. Dec 80, 286p EPA-600/3-80-000
Contract EPA-68-03-0316

This research was undertaken to develop laboratory culture techniques for striped bass (Morone saxatilis) that could be used to provide an adequate supply of various life stages of this important fish species for water quality and hazard evaluation testing. The work includes both an extensive literature review of the data available on all aspects of its life history and a program of laboratory experiments to determine the optimal rearing conditions for each life stage. A comprehensive set of procedures was developed and described in step-by-step manner for use by research personnel wishing to maintain laboratory populations of striped bass for physiological and toxicological use.

PB82-150079
(Order as PB82-150004, PC **A09**/MF **A09**)
Washington Univ., Seattle. Center for Quantitative Science in Forestry, Fisheries, and Wildlife.
Economic Feasibility of Domestic Groundfish Harvest from Western Alaska Waters: A Comparison of Vessel Types, Fishing Strategies, and Processor Locations,
C. M. Lynde. Nov 80, 13p NOAA-81103002-7
Included in Fishery Bulletin, v79 n2 p303-314 1981.

An economic model relating fishing costs to vessel characteristics and operating conditions is used in the report to estimate the costs and benefits to U.S. fishermen of harvesting groundfish under a variety of conditions. Comparisons were made between (1) two vessel types, (2) two modes of operation: delivering to a floating processor and delivering to a shore-based processor, and (3) three fishing strategies in Alaskan waters.

PB82-150095
(Order as PB82-150004, PC **A09**/MF **A09**)
National Marine Fisheries Service, Beaufort, NC. Beaufort Lab.
Recruitment and Exploitation of Gulf Menhaden, 'Brevoortia patronus',
Dean W. Ahrenholz. Sep 80, 13p NOAA-81103002-9
Included in Fishery Bulletin, v79 n2 p325-335 1981.

Gulf menhaden, Brevoortia patronus, range along the Gulf of Mexico coast from Cape Sable, Florida, to Veracruz, Mexico, and are exploited by a purse seine fish-

ery from Alabama to eastern Texas. Rates of exploitation, population movement, and recruitment into the fishery were estimated from returns of tagged juveniles and adults.

PB82-153412 PC **A03**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Marine Fisheries Review. Volume 43, Number 6, June 1981.
Jun 81, 45p NOAA-81120301
See also Volume 43, Number 1, PB81-225179 and PB82-153420 thru PB82-153453.

In addition to the regular features, this issue contains the following articles: Atlantic skipjack tuna: Influences of mean environmental conditions on their vulnerability to surface fishing gear; Burnt tuna: Conditions leading to rapid deterioration in the quality of raw tuna; Quality of squid, Illex illecebrosus, mantles canned in oil; and A system of singulate and align squid for packaging and processing.

PB82-153420
(Order as PB82-153412, PC **A03**/MF **A01**)
National Marine Fisheries Service, La Jolla, CA. Southwest Fisheries Center.
Atlantic Skipjack Tuna: Influences of Mean Environmental Conditions on Their Vulnerability to Surface Fishing Gear,
R. H. Evans, D. R. McLain, and R. A. Bauer. Jun 81, 12p NOAA-81120301-1
Included in Marine Fisheries Review, v43 n6 p1-11 Jun 81.

Pertinent data and literature are examined to determine the effects of the environment on the spatial distribution of skipjack tuna, Katsuwonus pelamis, in both Atlantic and Pacific Oeans. Environment/skipjack distribution relationships derived from this information are applied to long-term annual mean distributions of dissolved oxygen and thermal structure for the Atlantic Ocean between lat. 40 degrees N and 40 degrees S. The depth of skipjack habitat is mapped. Within the defined habitat areas, high vulnerability of skipjack tuna to surface gear is inferred and compared with the long-term catch.

PB82-936500 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Mechanisms of Carcinogenesis: Oncogenic Transformation.
Cancergram CK14.
1982, 12 issues
Supersedes PB81-936500.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers selected aspects of oncogenic transformation of cells by chemical, physical, and viral agents, and spontaneously occurring transformation; effects of transformation on cell proliferation and progression through the mitotic cycle; effects on cell morphology, cell metabolism, and other cellular biochemistry; effects on the structure, composition, and function of the cell surface and cell membrane; and studies of enhancement or prevention of transformation. Emphasis is placed on comparison between transformed and normal cells, and on the effects of transformation that may contribute to recognition of the process of oncogenesis or to the tumorigenic properties of the transformed cells. This Cancergram excludes studies of the composition, structure, and genetic character of virus particles or virus fragments, and studies of the occurrence, replication, recovery, and infectivity of viruses or virus fragments, except in cases where these studies relate in a highly specific way to transformation. The Cancergram also generally excludes in vivo studies relating to the progression of malignancy as revealed by histological studies.

6D. Bionics

AD-A108 733/7 PC **A02**/MF **A01**
SRI International, Menlo Park, CA. Artificial Intelligence Center.
Plan Synthesis: A Logical Perspective,
Stanley J. Rosenchein. Mar 81, 21p
Contract N00014-80-C-0296

This paper explores some theoretical issues of robot planning from the perspective of propositional dynamic logic. A generalized notion of 'progression' and 'regression' of conditions through actions is developed. This leads to a bidirectional single-level planning algorithm which is easily extended to hierarchical planning. Multiple pre/post-condition pairs, complex (conjunctive, disjunctive) goals, goals of maintenance and prevention, and plans with tests are all handled in a natural way. The logical framework is used to clarify gaps in existing 'nonlinear' and 'hierarchical' planning strategies. (Author)

AD-A108 734/5 PC **A02**/MF **A01**
SRI International, Menlo Park, CA. Artificial Intelligence Center.
Distributed Artificial Intelligence,
Nils J. Nilsson. 25 Mar 81, 13p
Contract N00014-80-C-0296

This report examines a number of advanced military information processing problems that entail computational tasks distributed over space. Communicational restrictions and other factors in these applications make it appropriate to consider networks of loosely coupled distributed artificial-intelligence (DAI) systems. Among the important conceptual difficulties of designing such networks is the problem of representing and using information about what one part of the network 'believes' about another part. We consider in some detail various aspects of this problem and briefly describe some potential solutions.

AD-A108 735/2 PC **A07**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Query Optimization by Semantic Reasoning.
Doctoral thesis,
Jonathan Jay King. May 81, 126p Rept no. STAN-CS-81-857
Grant N00039-80-G-0132

The problem of database query optimization is to select an efficient way to process a query expressed in logical terms from among the alternative ways it can be carried out in the physical database. This thesis presents a new approach to this problem, called semantic query optimization. The goal of semantic query optimization is to produce a semantically equivalent query that is less expensive to process than the original query. Semantic query optimization actually transforms the original query into a new one by means of a process of inference. The transformations are limited to those that yield a semantically equivalent query, one that is guaranteed to produce the same answer as the original query in any permitted state of the database. This guarantee is achieved because the knowledge used to transform a query is the same knowledge used to insure the semantic integrity of the data stored in the database. Thus, semantic query optimization brings together the apparently separate research areas of query processing and database integrity. The thesis formally defines transformations that preserve semantic equivalence for queries in the relational calculus. In addition, it identifies several classes of cost-reducing query transformations for relational database queries, and provides quantitative estimates of the improvements they can produce, based upon widely accepted models of query processing. The thesis also discusses the design and implementation of a system that carries out semantic query optimization for an important class of relational database queries.

PB82-147885 PC **A04**/MF **A01**
College of William and Mary, Williamsburg, VA. Dept. of Mathematics and Computer Science.
User's Manual for UCIN-INERTIA: A Computer Program for Computing Inertia Properties of Arbitrarily Shaped Robot Links,
Frederick A. Kelly, and Ronald L. Huston. Oct 81, 52p NSF-UC-MIE-101581-12, NSF/MEA-81011
Grant NSF-MEA81-01110

A user's manual is presented for the computer program UCIN-INERTIA, which is intended to provide its users with an easy to use, automatic, and efficient tool for computing the inertia properties of arbitrarily shaped robot or manipulator links. An overview of the program is included and its capabilities and limitations are noted. The geometrical properties of the fundamental element shapes used in forming the robot links are described. An example run is given along with specific input data and the output record. The computer code, written in Fortran-IV, contains 1,510 lines of source. A 39K core is required with a typical run time of one-fourth of a second.

6E. Clinical Medicine

AD-A108 139/7 PC **A06**/MF **A01**
Dwight David Eisenhower Army Medical Center, Fort Gordon, GA. Clinical Investigation Service.
Clinical Investigation Program Report.
Annual rept. for FY81,
Kent M. Plowman. 1 Oct 81, 118p

Identified are the research activities conducted by Dwight David Eisenhower Army Medical Center investigators through protocols approved by the Institutional Review Committee for registration with the Department of Clinical Investigation during Fiscal Year 1981, and other known publications and presentations by the Dwight David Eisenhower Army Medical Center professional staff. A detail sheet of each protocol giving the objective, technical approach, and progress is presented.

AD-A108 210/6 PC **A02**/MF **A01**
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Effect of Infection on Nutrient Metabolism.
Interim rept.,
Robert W. Wannemacher, Jr. 17 Sep 81, 6p

Acute clinical illness caused by an infectious process is typically characterized by a catabolic response, which includes loss of body weight, wasting of body protein, anorexia, increased metabolic rate, and negative nitrogen, potassium, phosphorous, magnesium, sulfur, and zinc balances. Part of the catabolic response can be reversed in laboratory animal models by providing an adequate supply of amino acid and calories via oral or intravenous route.

AD-A108 215/5 PC **A02**/MF **A01**
Army Medical Research Unit, Nairobi (Kenya).
Probing by Glossina morsitans morsitans and Transmission of Trypanosoma (Nannomonas) Congolense,
Lyman W. Roberts. 7 Mar 81, 5p
Grant DAMD17-80-G-9475
Pub. in Jnl. of Tropical Medicine and Hygiene, v30 n5 p948-951 1981.

No abstract available.

AD-A108 217/1 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Shigella sonnei Plasmids: Evidence that a Large Plasmid is Necessary for Virulence,
Philippe J. Sansonetti, Dennis J. Kopecko, and Samuel B. Formal. 22 May 81, 11p
Pub. in Infection and Immunity, v34 n1 p75-83 Oct 81.

No abstract available.

AD-A108 282/5 PC **A02**/MF **A01**
Case Western Reserve Univ., Cleveland, OH.
Enzymatic Production of Universal Donor Erythrocytes.
Final rept. Nov 78-Aug 81,
Lansing C. Hoskins. Oct 81, 9p
Contract N00014-79-C-0034

The aims of this research contract were: 1) to isolate in pure culture strains of human enteric bacteria with the specialized ability to produce strong activities of extracellular glycosidases that convert blood type A or B erythrocytes to universal donor blood type O erythrocytes; 2) to purify the blood type B-degrading enzyme produced by a fecal strain of Ruminococcus AB; 3) to determine whether human type B red cells could be safety converted by this glycosidase to universal donor type O red cells for use on blood transfusion. Aim 1 was accomplished with the isolation of 2 strains that produce strong blood group A-degrading activity but no B-degrading activity. These complement our previous isolation of the strain of Ruminococcus AB that produces B-degrading but no A-degrading activity. Aim 2, purification of the B-degrading enzyme in culture supernates of Ruminococcus AB, resisted a wide variety of classical protein separation methods until the last 2 months of the contract. As detailed in the report, major purification appears to have been achieved by digestion with papain followed by gel exclusion of chromatography on Sephadex G-200 in 3M NaC1. With successful completion of Aim 2 it will now be possible to meet the objectives of Aim 3.

AD-A108 309/6 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Hypophysectomy Alters Cardiorespiratory Variables: Central Effects of Pituitary Endorphins in Shock.
John W. Holaday, Mary O'Hara, and Alan I. Faden. 4 Aug 80, 8p
Pub. in American Jnl. of Physiology: Heart and Circulatory Physiology, v241 pH479-H485 1981.

No abstract available.

AD-A108 310/4 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
A General Approach to Standardization of the Solid-Phase Radioimmunoassay for Quantitation of Class-Specific Antibodies.
Wendell D. Zollinger, and John W. Boslego. 26 Feb 81, 14p
Pub. in Jnl. of Immunological Methods, v46 p129-140 1981.

No abstract available.

AD-A108 330/2 PC **A02**/MF **A01**
Iowa Univ., Iowa City. Dept. of Statistics.
On Testing Two Theories Regarding the Genetic Makeup of Patients Suffering from Unipolar Affective Disorder.
Technical rept.,
Tim Robertson, and Giles Warrack. Sep 81, 12p
Rept no. TR-76
Contract N00014-80-C-0321

In a previous article, Cadoret, Woolson and Winokur (1977) considered two theories regarding the genetic makeup of patients suffering from unipolar affective disorder. (1) The 'qualitative' theory, which postulates that the genetic makeup of those afflicted early in life (under 40 years old), and those who are afflicted later (over 40) is somehow different, and (2) The 'quantitative' theory which maintains that there is a particular type of gene causing u.a.d., and that those who succumb earlier do so because they possess the gene in greater numbers. Using likelihood ratio techniques from order restricted interference, we analyze their data and compare the two analyses.

AD-A108 379/9 PC **A02**/MF **A01**
Office of Naval Research, London (England).
Ninth International Conference on Sarcoidosis.
Conference rept.,
John C. Rose. 15 Oct 81, 9p Rept no. ONRL-C-11-81

In this report on the most recent international conference on sarcoidosis, the author discusses the current status of sarcoidosis research and the latest developments in clinical treatment as they were related at the conference. He also refers to the differing opinions that were presented about diagnosis and treatment of the disease, as well as recommendations that were made as to future areas of study. (Author)

AD-A108 440/9 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
More Action Needed to Reduce Beneficiary Underpayments.
3 Sep 81, 12p Rept no. GAO/HRD-81-126
Report to the Honorable Lawton Chiles, United States Senate.

This report represents the results of follow-on work to an earlier report. That report, entitled 'Reasonable Charge Reductions Under Part B of Medicare,' addressed four areas where beneficiaries were subject to inequitable out-of-pocket costs for services covered by Medicare. This report contains another recommendation to the Secretary of HHS which we believe will provide further safeguards for preventing underpayments to beneficiaries for services covered by Medicare. Claims that are subject to relatively large reasonable charge reductions often involve underpayments which go undetected because of poor claims review. The Health Care Financing Administration (HCFA)--as part of its Contractor Performance Evaluation program and related Carrier Quality Assurance program should specifically address how well its contractors (carriers) review and resolve the discrepancies on these types of claims. This report also provides an assessment of HHS actions taken on recommendations made in the October 1980 report.

HRP-0903744/1 PC **A09**/MF **A01**
Southern Maryland Health Systems Agency, Clinton.
Mental Health Plan: A Component of the Health Systems Plan (Maryland, Area 3).
Jul 81, 199p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

A comprehensive range of services that should be available to meet the needs of individuals with mental health problems and their families are identified in this section of the Health Systems Plan for the Southern Maryland Health Services Agency. The mental health needs of children and adolescents, adults, and the elderly are addressed. Mental health as a health status problem is discussed, and the prevalence of mental health problems among various age groups in Southern Maryland is estimated. Focus is on outpatient mental health services; inpatient hospital psychiatric services; community reintegration and support services; and residential and day treatment for emotionally disturbed children and adolescents. The goals of the plan are: to increase the opportunity for the population to function at their maximum human capacity and their ability to cope with the stresses and strains of living; to reduce the incidence and prevalence of mental health problems; to promote dignified living situations for the chronically mentally disabled; and to ensure that outpatient mental health services are available in sufficient quantity to meet the needs of Southern Maryland residents. An inventory of available services and a glossary of terms are included.

HRP-0903749/0 PC **A04**/MF **A01**
Regional Health Planning Council, Newark, NJ.
Annual Implementation Plan, 1981-1982 (New Jersey, Area 2).
Dec 80, 61p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Emphasis in this Annual Implementation Plan (AIP) is on health systems change. The plan, which outlines specific short-term actions for high priority objectives of the Health Systems Plan (HSP) of the Regional Health Planning Council for Essex, Morris, Union, Warren, and Sussex counties, New Jersey, covers the April 1981 through March 1982 period. The plan's initial focus is on revised local and regional priority issues, agency responsibilities, resource constraints, revised priorities among HSP goals and objectives, and a review of major accomplishments in 1980. The second section of the plan is devoted to AIP objectives. Attention is directed to organization and format, programs and facilities (criminal justice system, long term care construction, coordination between levels, medical day care, residential health care linkages, risk classification guide, reducing excess capacity (perinatal), family planning, Community Mental Health Center Essex Service Area 2, primary care coalition, screening/detection coordination, fluoridation, and psychiatric bed need); and public education involvement. Regional high priority issues are health promotion services, mental health and substance abuse services, sub-acute care maintenance services (especially geriatric), primary care services, and maternal, infant and child health services. An appendix discusses the relationship between the HSP and the AIP.

HRP-0903758/1 PC **A04**/MF **A01**
Health Systems Agency of Southeastern Pennsylvania, Philadelphia.
Insurance Coverage in the Health Systems Agency of Southeastern Pennsylvania Service Area.
Final rept.
22 May 80, 61p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. Prepared by Kappa Systems, Inc., Arlington, VA.

To determine the extent of existing coverage and to identify coverage gaps, the Health Systems Agency of Southeastern Pennsylvania (HSA/SP) contracted a study to analyze health and mental health benefits offered through Medicare and Medicaid, private insurers, and health maintenance organizations (HMOs) serving the five-county area. Data collection was limited to secondary sources, which provided generic information rather than employee, health plan, or population specific data. The study found that a majority of the area's residents have coverage, yet it may be insufficient or inaccessible because of financial and other barriers. A proportionally small group of persons were without coverage, due to their age, employment condition, or income level. The following were among the conclusions reached: out-of-pocket costs to Medicare beneficiaries can be very high, and benefit limitations are so restrictive that necessary care may be unavailable to beneficiaries; eligibility criteria for participation in Medicaid are so restrictive that a significant proportion of the area's poor population cannot qualify; and insurance coverage provided by the private insurers and HMOs through place of employment is adequate for the insured person and his/her dependents. HSA/SP action alternatives are proposed.

HRP-0903761/5 PC **A02**/MF **A01**
Southern New Jersey Health Systems Agency, Bellmawr.
End Stage Renal Disease Services Guidelines.
Apr 79, 18p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Guidance is presented to assist in the review of certificate of need applications for establishing new or expanding existing end-stage renal disease (ESRD) programs. In determining the health care need for a program, attention must be given to the number of persons in the proposed service area who have ESRD and to the number of persons who may be afflicted with ESRD over the ensuing 5 years. Other considerations are facilities in the region that provide ESRD services and the potential gap between the need or demand for ESRD services and service availability. Additional concerns are whether the proposed program's need is documented in the health systems plan and whether proposed actions will impact the expressed need. If there is a need for more treatment services and hemodialysis is the treatment of choice, of particular importance is whether the program applicant will sustain a reasonable number of less costly self-dialyzing and home maintenance dialysis patients. How the program applicant approaches the patient rights issue is crucial, as is the accessibility of ESRD services to all segments of the target population. Consideration must be given to rehabilitative and psychosocial counseling services if needed, staff continuing education, and appropriateness of the program's cost (capital costs, annual operating costs, estimated cost per dialysis, and charge per dialysis). Explanatory notes on the ESRD guidelines are included.

HRP-0903766/4 PC **A02**/MF **A01**
Southern New Jersey Health Systems Agency, Bellmawr.
Plan Implementation Technical Assistance Guidelines.
Jul 80, 15p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The purpose of these guidelines is to define and establish procedures by which the health systems agency's Implementation Department will provide technical assistance to organizations outside the agency. The goal of technical assistance is to facilitate changes and improvements that will improve the health care system in a manner consistent with agency plans. The legal basis of technical assistance provision is found in P.L. 93-641, with two types of technical assistance identified: (1) assistance to health service entities for conducting mandated reviews; and (2) assistance to community entities for developing and implementing institutional development plans. Agency assistance is characterized by one or more of four roles (advisor, convener, clearinghouse, disseminator). Application procedures for obtaining technical assistance are detailed, and guidelines used by the agency in reviewing assistance requests are outlined. The agency technical assistance request log and a record sheet showing the technical assistance provided to an approved requestor are appended.

HRP-0903779/7 PC **A13**/MF **A01**
National League for Nursing, Inc., New York. Div. of Research.
Employment, Mobility, and Personal Characteristics of Nurses Newly Licensed in 1979, Michigan. Volume 22, Part 1.
Aug 81, 300p
Contract PHS-HRA-232-80-0050
See also Volume 22, Part 2, HRP-0903780.

This volume is a component part of the third edition of the State and Local Report Series Employment, Mobility and Personal Characteristics of Newly Licensed Nurses. The data summaries for this edition (1979) were prepared by the National League for Nursing (NLN), under contract with the Health Resources Administration, from data collected by the National

League for Nursing in their annual surveys of newly licensed nurses. The first two editions (1977 and 1978) are available from the NLN. The series consist of 50 volumes, with some volumes having up to 5 parts. Volume 1 (The State Summaries) provides national summary information by State, for all variables, and Volumes 2-50 (individual State reports) provides the same information for Health Service Area's (HSA's) and counties within the HSAs of the State. These reports contain timely, up-to-date and relevant statistical information of interest to questions on the supply, demand, and distribution of nurses. The data will be helpful to those persons responsible for planning, recruiting, or research in the area of health manpower, particularly in monitoring the dynamics of nursing manpower.

HRP-0903780/5 PC **A18**/MF **A01**
National League for Nursing, Inc., New York. Div. of Research.
Employment, Mobility, and Personal Characteristics of Nurses Newly Licensed in 1979, Michigan. Volume 22, Part 2.
Aug 81, 411p
Contract PHS-HRP-232-80-0050
See also Volume 22, Part 1, HRP-0903779.

This volume is a component part of the third edition of the State and Local Report Series Employment, Mobility and Personal Characteristics of Newly Licensed Nurses. The data summaries for this edition (1979) were prepared by the National League for Nursing (NLN), under contract with the Health Resources Administration, from data collected by the National League for Nursing in their annual surveys of newly licensed nurses. The first two editions (1977 and 1978) are available from the NLN. The series consist of 50 volumes, with some volumes having up to 5 parts. Volume 1 (The State Summaries) provides national summary information by State, for all variables, and Volumes 2-50 (individual State reports) provides the same information for Health Service Area's (HSA's) and counties within the HSAs of the State. These reports contain timely, up-to-date and relevant statistical information of interest to questions on the supply, demand, and distribution of nurses. The data will be helpful to those persons responsible for planning, recruiting, or research in the area of health manpower, particularly in monitoring the dynamics of nursing manpower.

HRP-0903781/3 PC **A14**/MF **A01**
National League for Nursing, Inc., New York. Div. of Research.
Employment, Mobility, and Personal Characteristics of Nurses Newly Licensed in 1979, Minnesota. Volume 23, Part 1.
Aug 81, 305p
Contract PHS-HRA-232-80-0050
See also Volume 23, Part 2, HRP-0903782.

This volume is a component part of the third edition of the State and Local Report Series Employment, Mobility and Personal Characteristics of Newly Licensed Nurses. The data summaries for this edition (1979) were prepared by the National League for Nursing (NLN), under contract with the Health Resources Administration, from data collected by the National League for Nursing in their annual surveys of newly licensed nurses. The first two editions (1977 and 1978) are available from the NLN. The series consist of 50 volumes, with some volumes having up to 5 parts. Volume 1 (The State Summaries) provides national summary information by State, for all variables, and Volumes 2-50 (individual State reports) provides the same information for Health Service Area's (HSA's) and counties within the HSAs of the State. These reports contain timely, up-to-date and relevant statistical information of interest to questions on the supply, demand, and distribution of nurses. The data will be helpful to those persons responsible for planning, recruiting, or research in the area of health manpower, particularly in monitoring the dynamics of nursing manpower.

HRP-0903782/1 PC **A17**/MF **A01**
National League for Nursing, Inc., New York. Div. of Research.
Employment, Mobility, and Personal Characteristics of Nurses Newly Licensed in 1979, Minnesota. Volume 23, Part 2.
Aug 81, 399p
Contract PHS-HRA-232-80-0050
See also Volume 23, Part 1, HRP-0903781.

This volume is a component part of the third edition of the State and Local Report Series Employment, Mobility and Personal Characteristics of Newly Licensed Nurses. The data summaries for this edition (1979) were prepared by the National League for Nursing (NLN), under contract with the Health Resources Administration, from data collected by the National League for Nursing in their annual surveys of newly licensed nurses. The first two editions (1977 and 1978) are available from the NLN. The series consist of 50 volumes, with some volumes having up to 5 parts. Volume 1 (The State Summaries) provides national summary information by State, for all variables, and Volumes 2-50 (individual State reports) provides the same information for Health Service Area's (HSA's) and counties within the HSAs of the State. These reports contain timely, up-to-date and relevant statistical information of interest to questions on the supply, demand, and distribution of nurses. The data will be helpful to those persons responsible for planning, recruiting, or research in the area of health manpower, particularly in monitoring the dynamics of nursing manpower.

HRP-0903784/7 PC **A12**/MF **A01**
National League for Nursing, Inc., New York. Div. of Research.
Employment, Mobility, and Personal Characteristics of Nurses Newly Licensed in 1979, Mississippi. Volume 24, Part 1.
Aug 81, 260p
See also Volume 24, Part 2, HRP-0903785.

This volume is a component part of the third edition of the State and Local Report Series Employment, Mobility and Personal Characteristics of Newly Licensed Nurses. The data summaries for this edition (1979) were prepared by the National League for Nursing (NLN), under contract with the Health Resources Administration, from data collected by the National League for Nursing in their annual surveys of newly licensed nurses. The first two editions (1977 and 1978) are available from the NLN. The series consist of 50 volumes, with some volumes having up to 5 parts. Volume 1 (The State Summaries) provides national summary information by State, for all variables, and Volumes 2-50 (individual State reports) provides the same information for Health Service Area's (HSA's) and counties within the HSAs of the State. These reports contain timely, up-to-date and relevant statistical information of interest to questions on the supply, demand, and distribution of nurses. The data will be helpful to those persons responsible for planning, recruiting, or research in the area of health manpower, particularly in monitoring the dynamics of nursing manpower.

HRP-0903785/4 PC **A11**/MF **A01**
National League for Nursing, Inc., New York. Div. of Research.
Employment, Mobility, and Personal Characteristics of Nurses Newly Licensed in 1979, Mississippi. Volume 24, Part 2.
Aug 81, 249p
Contract PHS-HRA-232-80-0050
See also Volume 24, Part 1, HRP-0903784, and Volume 24, Part 3, HRP-0903786.

This volume is a component part of the third edition of the State and Local Report Series Employment, Mobility and Personal Characteristics of Newly Licensed Nurses. The data summaries for this edition (1979) were prepared by the National League for Nursing (NLN), under contract with the Health Resources Administration, from data collected by the National League for Nursing in their annual surveys of newly licensed nurses. The first two editions (1977 and 1978) are available from the NLN. The series consist of 50 volumes, with some volumes having up to 5 parts. Volume 1 (The State Summaries) provides national summary information by State, for all variables, and Volumes 2-50 (individual State reports) provides the same information for Health Service Area's (HSA's) and counties within the HSAs of the State. These reports contain timely, up-to-date and relevant statistical information of interest to questions on the supply, demand, and distribution of nurses. The data will be helpful to those persons responsible for planning, recruiting, or research in the area of health manpower, particularly in monitoring the dynamics of nursing manpower.

HRP-0903786/2 PC **A13**/MF **A01**
National League for Nursing, Inc., New York. Div. of Research.
Employment, Mobility, and Personal Characteristics of Nurses Newly Licensed in 1979, Mississippi. Volume 24, Part 3.
Aug 81, 296p
Contract PHS-HRA-232-80-0050
See also Volume 24, Part 2, HRP-0903785.

This volume is a component part of the third edition of the State and Local Report Series Employment, Mobility and Personal Characteristics of Newly Licensed Nurses. The data summaries for this edition (1979) were prepared by the National League for Nursing (NLN), under contract with the Health Resources Administration, from data collected by the National League for Nursing in their annual surveys of newly licensed nurses. The first two editions (1977 and 1978) are available from the NLN. The series consist of 50 volumes, with some volumes having up to 5 parts. Volume 1 (The State Summaries) provides national summary information by State, for all variables, and Volumes 2-50 (individual State reports) provides the same information for Health Service Area's (HSA's) and counties within the HSAs of the State. These reports contain timely, up-to-date and relevant statistical information of interest to questions on the supply, demand, and distribution of nurses. The data will be helpful to those persons responsible for planning, recruiting, or research in the area of health manpower, particularly in monitoring the dynamics of nursing manpower.

HRP-0903787/0 PC **A08**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
National Sample Survey of Registered Nurses II Status of Nurses: November 1980,
Dale C. Jones, Barbara S. Bentley, Ellen M. Kendall, Susanne G. Moulton, and S. Jack Shirey. Oct 81, 175p
Contract PHS-HRA-232-80-0042
See also report dated Sep 77, PB81-172363.

This is the summary report of data collected in the second national sample survey of registered nurses. The report, prepared by the contractor who carried out the study, serves as a basic document on the study, providing a review of the initial findings in the areas covered by the survey instrument and a description of the survey objectives and methodology. Questionnaires were mailed to about 40,000 individuals with current licenses to practice as registered nurses in the fall of 1980. The number of respondents totalled 30,703, or 79 percent of those surveyed. Responses to the survey were weighted to reflect the universe of registered nurses. The estimated number of registered nurses with current licenses to practice located in the United States in November 1980 was 1,615,846. Of these, an estimated 1,235,152 RN's were employed in nursing, 76 percent of the total RN's. The study also provides data on the demographic characteristics of the nurse population, their educational background, type of nursing employment and the functions performed, their hours of work and earnings, their activities if not employed in nursing and their geographic location.

HRP-0903788/8 PC **A02**/MF **A01**
Alpha Center for Health Planning, Bethesda, MD.
Business Health Coalitions: An Overview,
W. David Helms. Dec 81, 10p TECHNICAL ASSISTANCE MEMO-51

Employers in this country are experiencing what they consider to be alarming increases in premiums for employee health benefits. Some companies are turning to employer coalitions in an attempt to contain rapidly rising health care costs. Their goal is to bring together the expertise and the financial purchasing power of groups of employers in an effort to identify causes of increased costs and to develop strategies for containing those costs. Coalition development can be seen as a natural and evolutionary result of the business community's perception that it cannot continue to rely on government and existing planning mechanisms to control health costs. It should be emphasized that business involvement in health care cost reduction is still in its infancy. Although it is estimated that approximately 50 coalitions have formed or are in the developmental process, there is little consistency in structure, staffing, membership or objectives.

HRP-0903790/4 PC **A04**/MF **A01**
Iowa Health Systems Agency, Des Moines.
Health Care Expenditures in Iowa, 1966-1979,
Henri Minette, and Jean Kroll. Jul 81, 62p

Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This updated report of a previously published (1980) funds flow analysis of the health care sector in Iowa is comprised of five sections. The first section examines changes in expenditures for personal health care, by type of expenditure and source of funds, and for select years between 1966 and 1978. The second section examines total and per capita expenditures for health care in the years 1966, 1969, 1974 through 1978, and provisional expenditure estimates for 1979. In section three, estimates of expenditures funded by public programs are presented. Section four compares Iowa personal health care expenditures with the gross state product. These Iowa figures are also contrasted with national health care expenditures and the gross national product. Section five compares Iowa per capita health expenditures with the expenditures of the other states in Federal Region VII. In order to facilitate comparisons between Iowa and the United States, this study generally employs the methodology and definitions used to calculate national health expenditures. A description of the methodology and a list of definitions is included in the appendix of this report. Tables and references are included.

HRP-0903791/2 PC **A09**/MF **A01**
Oklahoma Health Planning Commission, Oklahoma City.
Oklahoma Health Manpower Report, 1978-1979,
Jack V. Boyd. 1980, 195p
Grant PHS-06-P-000217

This publication reports the results of an effort to assemble information on 78 kinds of health personnel in Oklahoma, on their distribution in the 77 counties, on certain institutional staffing patterns during the fall of 1978, and on output of education programs preparing health personnel in the state. The basic health manpower list, definitions, and questionnaires (and instructions accompanying them) used as a basis for the 1978 Oklahoma health manpower assessment were developed by the Oklahoma Interagency Task Force for Health Manpower Data. The list is restricted to health personnel requiring special educational preparation or experience and credentials and related workers in the same service grouping. The employer survey and the survey of professional associations and licensure agencies questionnaires were mailed out by the Oklahoma Health Planning Commission. There was a high degree of participation among most groups surveyed. Narrative accounts of individual occupations, including composition, educational requirements, and employment opportunities, were prepared from information on returned professional association and licensure agency questionnaires, and from various state, Federal, and research reports. Sources are indicated at the end of each account. State summary tables for selected manpower categories and state tabulations of manpower in selected employment setting are given. The appendix includes the survey questionnaires, instruction sheets, descriptions of Task Force for Manpower data, and definitions. References, index, and tables are included.

HRP-0903795/3 PC **A04**/MF **A01**
Michigan Dept. of Public Health, Lansing.
Study of Selected Regulatory Programs. Appendix IV: Clinical Laboratory Licensure.
5 Jun 81, 64p
See also Appendix 3, HRP-0903794 and Appendix 5, HRP-0903796.

Past and present impacts of the laboratory licensure program in Michigan are reviewed and the effects of maintaining, reducing, or eliminating the program in the future are assessed.

HRP-0903796/1 PC **A04**/MF **A01**
Michigan Dept. of Public Health, Lansing.
Study of Selected Regulatory Programs. Appendix V: Radiological Health Program.
10 Jun 81, 72p
See also Appendix 4, HRP-0903795.Portions of this document are not fully legible.

Contents:
- The impact on the public health of Michigan State of the elimination of the Radiological Health Program;
- The impact on the public health of Michigan State if the frequency of registration, licensure, and inspection of radiation facilities is revised to biennial;
- Changes in law, regulation, or administrative patterns necessary to coordinate radiation facility inspections rather than unilateral inspections by multiple agencies;
- The improving of equity in the level of fees charged;
- The steps necessary to relieve the paperwork and reporting burden placed on radiation facilities by licensure and related programs;
- The other efficiencies which may be realized in the Radiological Health Program.

HRP-0903797/9 PC **A03**/MF **A01**
Wisconsin Association for Perinatal Care, Madison.
Toward Improving the Outcome of Pregnancy in Wisconsin: Report of the Statewide Perinatal Task Force Meeting, October 30-31, 1980, Madison, Wisconsin.
1981, 44p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD., March of Dimes Birth Defects Foundation, White Plains, NY., and Wisconsin Maternal and Child Health Program, Madison.

The perinatal care system consists of maternity services (prenatal, ante-intra-postpartum, and interconceptional care) and newborn services (neonatal intensive, normal nursery, and infant follow-up care). The goal of the task force was to develop a generally acceptable set of statewide perinatal guidelines to identify minimum capabilities at the primary, secondary, and tertiary levels. Guidelines are presented for the following aspects of perinatal care: prenatal care (primary level, 6 guidelines; secondary level, 8 guidelines; tertiary level, 9 guidelines); intrapartum care (10, 10, 10); postpartum care (6, 6, 6); neonatal care (7, 7, 7); other (3, 4, 8); and personnel requirements (4, 5, 6). Some guidelines have multiple parts and contain quantifiable requirements. The Development of Family-Centered Maternity/Newborn Care in Hospitals, by the Interprofessional Task Force on Health Care of Women and Children, has been incorporated into these guidelines. Four recommendations are made: (1) Wisconsin health planning agencies should consider these guidelines when developing perinatal standards; (2) the guidelines should be reviewed and revised in the fall of 1981; (3) the need for a statewide perinatal advisory committee should be studied; and (4) development and coordination of regional and statewide perinatal services should be promoted. Definitions, references, tables, task force participants, and a map are included.

HRP-0903802/7 PC **A07**/MF **A01**
PACE Management Associates, Washington, DC.
Proposed Methodologies for Conducting Assessments of Health Status and Health Systems Status with Regard to Problems of Alcohol and Drug Abuse.
Oct 79, 144p
Sponsored in part by Health Systems Agency of Southeastern Pennsylvania, Philadelphia, and Bureau of Health Planning, Hyattsville, MD.

This health systems agency explored methodologies for determining gross needs, unmet needs, and demands for services for alcohol and drug abusers. Three study tasks were specified: (1) resource-based methodology; (2) population-based methodology; and (3) methodologies for interrelating the first and second tasks. The decision was made to recommend an integrated methodology which appropriately interfaces data from populations and data from resources to achieve two principal analyses required by Federal law and the health systems planning taxonomy. This methodology involved an analysis of the population's health status and an analysis of the health system's impact on health status. As shown by a literature review, most alcohol and drug abuse plans developed by single State agencies and even most health systems plans presented data on populations and resources but did not evidence the use of any successful methodologies for interrelating these data elements. The following recommendations are made to achieve an interrelated methodology: use existing treatment data, synthetic estimators, existing survey data, and census tract data to estimate incidence and prevalence data for alcohol and drug abusers; use a small sample survey technique to develop refined data on health, socioeconomic, educational, and other needs; administer a special resource survey to non-network resources to provide both program and client information; administer a specially-designed evaluation protocol to elicit process and outcome data tailored to health systems agency taxonomy requirements; and employ a management review procedure to generate data on costs and manpower. Appendixes are not included with the document.

HRP-0903804/3 PC **A03**/MF **A01**
Central New York Health Systems Agency, Inc., Dewitt.
Report of the Hospice Steering Committee of the Tompkins County Comprehensive Health Planning Council.
21 May 80, 37p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Over the 1979-1980 period, the Hospice Steering Committee in Tompkins County, N.Y., explored the hospice concept and the need to plan expanded services for terminally ill patients and their families. The committee defines the philosophy of hospices as care rather than cure, and there are not heroic measures taken to prolong life. Rather, the dying patient is helped to conclude his or her life free of pain, depression, isolation, and frustration, and with a sense of dignity and self worth. As envisioned by the committee, hospice care means providing a personalized and coordinated community program to meet individual desires and special needs during the last weeks or months of life. Needs, recommendations, and comments pertinent to the hospice mode of service delivery focus on physician involvement; inservice training for health professionals, social workers, the clergy, and family members; supportive and backup services for terminally ill patients and their families; hospital planning; community education and community service coordination; home care services; trainined volunteers who provide patient care, staff support, and on-call services; and hospice organization and financing. The committee recommends that the Tompkins County Health Department act as the sponsoring agency for the hospice program; the committee sees no need for a free-standing hospice. Appendixes contain supplementary information on hospice planning, and programs and services for the terminally ill in Tompkins County, criteria for the admission of individuals to home care services, the reaction of physicians to the hospice philosophy, and hospice financing.

HRP-0903808/4 PC **A03**/MF **A01**
Central New York Health Systems Agency, Inc., Dewitt.
A Study of the Need for Adult Day Care Services in Tompkins County.
Apr 80, 37p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The local need in Tompkins County, N.Y., for adult day care programs was assessed in 1978. Questionnaires were distributed to provider agencies, and 217 service users ranging in age from 19 to 97 years were identified. Data showing the most significant justification for adult day care services were based on functional limitation findings and analysis. This grouping quantified the potential extent as well as participant limitations essential to a health-oriented adult day care program. Functional categories included bathing, dressing, eating/feeding, speech, toileting, incontinence, transferring, wheeling, and walking. Other functional groupings concerned age, sex, race, marital status, living situation, income, daily status, mental status, impairments, and diagnosis. Analysis of all functional assessment items (excluding disoriented, occasionally confused, alert, and forgetful) revealed 178 people who would function fairly independently. Based on a health model analysis of functioning, it was determined that there is a need for adult day care services of the health model type in Tompkins County. Supporting data are provided. Included are a list of provider agencies, a potential day care user data form, the survey codebook, and a form indicating New York State long-term care placement guidelines.

HRP-0903810/0 PC **A02**/MF **A01**
North Central Area Health Planning Association, Wausau, WI.
CT Scanner Services: Health Systems Plan and Appropriateness Review.
Sep 81, 20p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The appropriateness review of the North Central Area Health Planning Association's (NCAHPA) computed tomography (CT) scanner services was completed using the agency's adopted review criteria. The analy-

sis of the area's current supply and utilization of these services found them to be appropriate. However, in the near future, several changes in the delivery of these services may be necessary to remedy the marginal accessibility of CT services to the residents in a portion of the area. The analysis includes a definition of CT scanning services and a background discussion. Costs associated with the purchase and operation of CT scanners and alternative procedures are considered. The need methodology employed by NCAHPA for CT scanners is the Head Equivalent Computed Tomography (HECT) system and the minimum annual level of utilization is set at 3,000 HECT units. Staffing, availability of services capable of treating CT scanner diagnosed conditions, availability of diagnostic modalities to complement CT scanning, and travel time are taken into consideration for this appropriateness review. Exhibits and tables in the appendices supplement the text. Footnotes are included.

HRP-0903813/4 PC **A03**/MF **A01**
South Carolina Statewide Health Coordinating Council, Columbia.
Task Force on the Future of Health Planning.
Final rept.
10 Sep 81, 29p

As the principal coordinator of health planning in South Carolina, the Statewide Health Coordinating Council appointed a special task force to study the health planning structure mandated under the National Health Planning and Resources Development Act, its accomplishments and its needs for revision, particularly in light of the proposed changes in federal policy. The Council's goal is to assist the continuing development of a rational, effective, and economical health care system in South Carolina, one that will assure availability of, and access to, needed health services through a purposeful planning system that is neutral, rational, and able to provide timely and appropriate information to the legislative and executive branches.

HRP-0903814/2 PC **A04**/MF **A01**
Georgia Health Planning and Development Agency, Atlanta.
Georgia's Unique Commitment to Health: Fiscal Patterns, Funding Problems, and Suggested Remedies,
Michael J. Clifford. Jul 81, 53p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The pattern of Georgia's expenditures for health care is considered with respect to the resources and constraints of other states in Federal Regions IV and VI and the United States. This fiscal analysis studies and compares three major forms of state expenditures: public health, hospitals, and Medicaid. Although Georgia appropriates a below average amount of expenditures for all government services, a higher proportion of its resources are allocated to health care; Georgia ranks second among states. This indicates that Georgia has either more need for governmental health care service or more relative resources to share. From 1975 to 1979, Georgia's annual allocation of governmental resources for health care treatment and programming has barely exceeded the eroding effects of inflation; the other states have comfortably outpaced inflation. The practical, legal, and political considerations were assessed for three options to stave off the effects of inflation. Increasing state funding and limiting services/restricting eligibility would have too many adverse consequences. Increasing productivity, including implementing alternatives to excess institutional care and analytical support for decisionmakers, possesses the fewest disadvantages. Tables and figures present supporting data. References/footnotes and technical notes are included in the appendix.

HRP-0903818/3 PC **A04**/MF **A01**
Three Rivers Health Systems Agency, Inc., Columbia, SC.
Plan for CT Scanner Services.
May 80, 53p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This study amends the computed tomography (CT) services section of the 1979-84 health systems plan of the Three Rivers Health Systems Agency. The utilization of the existing CT scanners is determined using head equivalent CT studies (HECTS). The conversion values are listed. Need is determined based on demand, utilization, and the minimum standards for utilization set forth in the National Guidelines. Criteria and guidelines for appropriateness review and certificate of need (CON) review are presented in the appendices for each of the health system characteristics. The respective numbers are availability (2 criteria, 2 standards); accessibility (6, 7); cost (3, 7); quality (8, 13); continuity (4, 12); and acceptability (3, 3). The standards include measurable data or specific performance targets. Rationale for these criteria and standards is discussed in the health system section of the study. Pertinent Federal regulations, a glossary of related terms, and a discussion of clinical conditions for which CT is efficacious are included in the appendices. The study defines CT services and discusses the historical background.

HRP-0903819/1 PC **A05**/MF **A01**
Three Rivers Health Systems Agency, Inc., Columbia, SC.
Plan for Institutional-Based Cardiac Services.
Apr 80, 77p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This revised section of the health systems plan concerns coronary care units, cardiac catheterization, and open heart surgery. Three health status goals seek to lower mortality from various types of heart disease. The services are then briefly analyzed in terms of health system characteristics, and need methodologies are presented for each. Appendices contain criteria and standards for appropriateness and certificate of need reviews. Those for coronary care units are availability (2 criteria, 2 standards); accessibility (7, 7); cost (4, 7); quality (13, 17); acceptability (4, 4); and continuity (3, 5). Those for cardiac catheterization are availability (3, 9); accessibility (7, 9); cost (5, 10); quality (11, 29); acceptability (4, 7); and continuity (4, 11). Those for open heart surgery are availability (3, 7); accessibility (7, 9); cost (5, 9); quality (12, 27); acceptability (4, 7); and continuity (4, 9). There is no discussion of rationale for the standards. Many standards contain several elements. Although references are given for the main body of the plan, they are not included for the criteria and standards.

HRP-0903820/9 PC **A05**/MF **A01**
Three Rivers Health Systems Agency, Inc., Columbia, SC.
Plan for Public-Supported Ambulatory Care Services.
Feb 81, 85p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The study contains a system analysis by characteristic of the ambulatory care services, recommended actions for planning, and criteria and standards by which the service can be reviewed for in-house evaluation of programs and review of proposed uses of Federal funds. The following programs under the prevention, detection, and treatment services category provided through a combined state and local effort are addressed for South Carolina Health Service Area II: immunization, dental health, family planning, maternal and child health, nutrition, school health care, screening (heart disease, cancer, tuberculosis, venereal disease control, lead poisoning, and early disease control), and migrant health. For each program, a discussion of background, scope of service, status analysis, characteristics, and planning recommendations is presented. Draft criteria/considerations and measurable standards are listed individually by program/service by health system characteristic: immunization (15 criteria, 19 standards), family planning (11, 17), maternity (11, 17), child health (11, 17), heart clinic (12, 17), cancer (11, 14), venereal disease (9, 11), lead poisoning (15, 22), and early disease detection (12, 13). Rationale and sources are not indicated.

HRP-0903821/7 PC **A03**/MF **A01**
Three Rivers Health Systems Agency, Inc., Columbia, SC.
Plan for Publicly Supported Community-Based Mental Health Services.
Jul 80, 40p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Intended to lend greater specificity to the existing health systems plan, this study contains a system analysis by characteristic for publicly supported, community-based mental health (MH) services, recommended actions for planning, and review criteria and standards for inhouse evaluation of programs and review of proposed uses of Federal funds. In time of severe financial cutbacks of MH centers, the Balance Service System (BSS) of the Joint Commission on Accreditation of Hospitals is recommended as the model for provision of services for the mentally ill. A key component of the BSS model is a system of referral to community agencies with careful monitoring of referral outcome. The BSS also looks at continually monitoring needs and identifying service gaps within the organization. Thereby, the BSS addresses such issues as maximizing and reallocation of staff time and setting priorities for delivery of care. The primary aim is to effect patient/client levels of function and self-determination, as well as social integration and appropriateness. The appendix includes the general criteria and standards for the six health system characteristics: availability (3 criteria, 5 standards); assessibility (6, 10); cost (3, 6); quality (5, 17); acceptability (4, 11); and continuity (4, 12). Most of the standards are measurable; no rationale or source is provided. Definitions and a list of social indicators highly correlated with need for MH services are given.

HRP-0903822/5 PC **A04**/MF **A01**
Three Rivers Health Systems Agency, Inc., Columbia, SC.
Plan for Radiation Therapy Services.
Jul 80, 56p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Radiation therapy is a clinical, medical specialty in which patients with cancers or other neoplasms are treated with ionizing radiation. This study, which focuses on megavoltage radiation therapy, considers a needs assessment methodology for radiation therapy services and presents specific criteria and standards for certificate of need and appropriateness reviews of these services. Future need is determined by first multiplying the Three Rivers health service area population by the incidence rate for new cancer to determine the number of new patients. Of these patients, 50 percent will require 30 treatments annually, while 2 percent will require 10 treatments annually. The resulting total number of required treatments is the projected need for radiation therapy services. Following a general discussion of cancer incidence and treatment modalities, the existing radiation therapy system in the Three Rivers area is reviewed and the desired system is considered. Criteria and standards are presented for each of the health system characteristics: availability (3 criteria, 6 standards); accessibility (5, 5); cost (5, 8); quality (5, 13); continuity (3, 6); and acceptability (2, 5). Standards include measurable requirements. No discussion of rationale is presented. Cancer data by specific site, state aid cancer clinics in South Carolina, and the minimum requirements for these clinics are appended. An executive summary, tables, footnotes, and a bibliography are included.

HRP-0903823/3 PC **A03**/MF **A01**
Three Rivers Health Systems Agency, Inc., Columbia, SC.
Plan for Rural/Urban Health Initiatives Services.
Dec 80, 35p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The Rural/Urban Health Initiatives (RHI/UHI) are designed to provide funding for basic health services in communities with limited resources. This study provides a basis for the evaluation of RHI/UHI programs and the review of proposed uses of Federal funds by the Three Rivers Health Systems Agency. A rural/urban health center should provide the following services: complete history and physical examination; periodic reassessment; referral and/or treatment of acute illness; management of chronic disorders; management of uncomplicated pre- and post-natal states; well-child care; family planning, nutrition, and other health education counseling; interim stabilization of critical conditions; first aid; coordination of primary care with other community health services; and provision of or referral for screening, diagnostic, and testing procedures. The characteristics of a desired system are outlined and the existing system of health-initiative sites is described. Programs currently operating should establish satellite centers as new programs are needed. RHI/UHI program criteria and standards are presented for the basic health system characteristics: availability (3 criteria, 5 standards); accessibility (8, 11); cost (5, 6); quality (9, 21); acceptability (3, 13); and continuity (4, 10). No rationale or sources for the standards are presented. Measurable requirements are provided. An executive summary and area desig-

nation requirements for primary care and dental manpower are included. Appendices are included.

HRP-0903824/1 PC **A03**/MF **A01**
Three Rivers Health Systems Agency, Inc., Columbia, SC.
Short-Stay Inpatient Psychiatric Services.
Feb 81, 36p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Short-stay psychiatric bed planning must incorporate various settings (outpatient, emergency department, short-stay, and long-stay), various diagnoses, and target populations requiring different degrees of treatment. Adequate manpower and support services are necessary to maintain a continuum of care. A regionalized approach must be utilized and catchment areas adjusted to provide for those areas without inpatient psychiatric facilities. Use rates need to be adjustable to allow for child/adolescent services. Use rates should be analyzed to address the impact of deinstitutionalization. Analysis of bed size and distribution should include consideration of proximity to service area, relationship to community services, comprehensiveness of service mix, cost-efficiencies, staffing ratios, and occupancy. The present methodology, an example of demand-based planning, calculates the current use rates by institution for age cohort, multiplies these rates by the projected population by age cohort, and uses an 80 percent occupancy rate. A new methodology which would plan for need should be developed. Health status as it pertains to mental health is discussed and the short-stay psychiatric services provided within the Three Rivers health service area are described. The respective numbers of criteria and standards for the health system characteristics are availability (3 criteria, 4 standards); accessibility (7, 9); cost (4, 6); quality (8, 15); acceptability (4, 4); and continuity (5, 8). No rationale or sources are provided.

HRP-0903826/6 PC **A02**/MF **A01**
North Central Area Health Planning Association, Wausau, WI.
Radiation Therapy Services: Health Systems Plan and Appropriateness Review.
Jul 81, 22p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The bulk of this document consists of standards for use in appropriateness review of megavoltage radiation therapy services. The six standards specify: (1) a service population of 150,000 per machine; (2) annual caseload of 200 patients per machine, to be increased to 250 by 1983; (3) annual minimum of 4,000 treatments per machine; (4) maximum travel time of 90 minutes; (5) use of multidisciplinary tumor boards to plan treatment regimens; and (6) periodic quality assurance reviews and participation in the Wisconsin Cancer Reporting System. Each standard is accompanied by identification of its source, health system characteristic(s) addressed, assumptions (if any), analysis, and institution-specific review findings. Overall findings indicate that the current availability and accessibility of radiation therapy services are generally appropriate for at least 2 of the 3 facilities until 1987. One health system goal is stated, which calls for no additional units in the area until existing units are performing at least 5,000 per year. Recommended actions suggest the discontinuation of radiation therapy services at a specific hospital and study of possible third-party payment for short-term living expenses for patients traveling long distances to undergo radiation therapy. One reference is cited. Exhibits, footnotes are included.

HRP-0903837/3 PC **A02**/MF **A01**
Central Pennsylvania Health Systems Agency, Inc., Lewisburg.
Spring Training for New Board Members: Workbook,
Marcia K. Hoffman. 8 Apr 81, 22p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The workbook presents training techniques to help orient new health systems agency board members. The training agenda includes a pre/post test to indicate gaps in knowledge and understanding and to test knowledge of concepts learned. An expectations exercise is provided, as well as a scavenger hunt designed to familiarize persons with agency reference materials. The workbook also contains small group decisionmaking skills and group reporting techniques. A program is outlined for recruiting and orienting volunteers.

HRP-0903841/5 PC **A09**/MF **A01**
New York State Health Advisory Council, Albany.
Public Policy and Primary Health Care: Issues and Recommendations Report of the Health Advisory Council Primary Care Task Force.
Feb 81, 183p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Primary health care was the focus of a 1980 task force which examined the provision of accessible, affordable, and high-quality care to all New York residents. The task force studied methods for planning, developing, financing, and regulating primary care services and deliberated on how these methods could be improved. Six components of primary care were identified: responsive care for episodic illness; continuing care of chronic illness; health screening and monitoring; preventive services; appropriate health education; and integration with care in acute care and long-term institutions. A statewide strategy for primary care development was explored, as well as health manpower supply and distribution policies in support of such care. Other topics of concern were primary care financing, the intergovernmental context of public health and primary care, certificate of need, quality assurance, and primary care research. The task force concluded that primary care is most successful when its components are coordinated and when the various services are responsive to local community needs and resources. It also determined that there is no single best way to provide primary care and that a coherent State policy could reduce fragmentation, lack of coordination, and high costs associated with primary care delivery.

HRP-0903843/1 PC **A04**/MF **A01**
Suburban Cook County-Dupage County Health Systems Agency, Inc., Oak Park, IL.
To Join or Not to Join: A Study of Employee and Employer Perceptions of Health Maintenance Organizations,
Eileen O'Farrell, James Rea, and Lon Berkeley. Aug 81, 52p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The findings and recommendations address the need for increasing the number of residents in the Suburban HSA area who are enrolled in HMOs. The HMO Task Force approached this issue from the perspective of identifying barriers to HMO enrollment and formulating recommendations in four accessibility categories: information/educational; economical/financial; organizational/administrative; and local/geographical.

HRP-0903844/9 PC **A04**/MF **A01**
West Central Illinois Health Systems Agency, Inc., Springfield.
Summary of Long-Range Planning for Hospitals in West Central Illinois,
Victoria D. Kamhi. Sep 81, 56p
Grant PHS-05-P-000245-05

A study of long-range plans submitted by hospitals in the West Central Illinois Health Service Area was recently completed by the West Central Illinois Health Systems Agency staff. The purpose of the study was twofold: to determine the extent of hospital long-range planning in the West Central Illinois Health Service Area and to develop a clear picture of future major Certificate of Need applications and changes in services projected by area hospitals. This publication is based on information obtained from the long-range plans which have been filed with the West Central Illinois Health Systems Agency and the Illinois Health Facilities Planning Board prior to August 15, 1981.

HRP-0903846/4 PC **A03**/MF **A01**
Wisconsin Legislative Council, Madison.
Report of the Ad Hoc Committee on Nursing Home Utilization,
Richard Sweet, Susan Goodwin, and Susan Felker-Donsing. Jan 81, 34p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Wisconsin's Ad Hoc Committee on Nursing Home Utilization made 16 recommendations to reduce inappropriate utilization of nursing homes. The committee's final report contains a discussion of the background and purpose of each recommendation. The recommendations include: placing a two-year moratorium on the issuance of certificates of need for the development of new nursing home beds; conducting a study on the feasibility of utilizing underused hospital beds for skilled care patients at lower reimbursement or for patients being transferred from a nursing home which loses its license; encouraging development and support of new community-based residential facilities and congregate housing facilities throughout Wisconsin; considering different forms of payment, including tax incentives; and addressing different issues concerned with the Medical Assistance Program. The appendices include a list of committee members; a discussion of the committee's background and activities; minority reports; and a bibliography of materials distributed to committee members.

HRP-0903847/2 PC **A04**/MF **A01**
Syracuse Univ., NY.
Models for Health Planning: Inter-Organizational Approaches Under Cutback Management,
Alfred Mauet, and Mark Burns. Oct 81, 52p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. Prepared in cooperation with Auburn Univ., AL.

The paper inventories several possible 'models' of inter-organizational relations from the standpoint of both their theoretical value and their potential relevance for 'real-world' operations of health planning--specific examples are covered from among conceptual formulations dealing with resource dependency, organizational contingency, organizational climate, domain consensus, and organizational design. Possible modifications and extensions of some of these models are also discussed.

HRP-0903848/0 PC **A03**/MF **A01**
PROJECT SHARE (HHS), Rockville, MD.
Home Care Services.
Jul 81, 40p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The trend toward home care services is explored in the 41 documents annotated in this Project SHARE bibliography. The cited documents analyze the cost differences between home and institutional care, the types of services necessary to a home care program, and the effectiveness of existing home care services. Materials included were published between December 1966 and 1980. Topics of particular interest are home care for the terminally ill and the rural elderly and the impact of reimbursement procedures on home care programs. An assessment of the Home Health Grant Program, which was authorized by the Health Revenue Sharing and Health Services Act to develop and expand home health agencies, is included. Entries are arranged alphabetically by first-named author. An alphabetized list of all personal and corporate authors and an index of titles are included.

HRP-0903849/8 PC **A04**/MF **A01**
Northern Indiana Health Systems Agency, Inc., South Bend.
Criteria and Standards for Long-Term Care Inpatient Facilities and Services.
Aug 81, 69p
Grant PHS-05-P-000212-07

This report correlates information available on drinking water quality with cancer and heart disease and recommends actions to reduce the potential of developing heart disease and/or cancer from materials found in drinking water. Chapter 1 discusses the historical development of safe drinking water while Chapter 2 examines the water treatment process as it stands today. Chapters 3 and 4 investigate the correlation between drinking water and cancer and review the research done on heart disease and drinking water. The potential drinking water problems in northern Indiana are studied in Chapter 5. The results of a telephone survey of the area's water suppliers are presented in Chapter 6. It examines the extent and frequency of tests on drinking water in the northern Indiana area. The survey responses, a listing of water suppliers, and the tests by plants surveyed are all tabulated. A copy of the survey form is appended. Tables, map, and references are included.

HRP-0903850/6 PC **A07**/MF **A01**
Florida Gulf Health Systems Agency, Inc., St. Petersburg.
Acute Hospital Services Plans for the Four Counties of Region IV.
Aug 81, 130p
Grant PHS-04-P-000226-06

This report is the result of an analysis of the acute hospital services for the four counties of the Florida Gulf Health Systems Agency (FGHSA): Hillsborough, Manatee, Pasco, and Pinellas. Six essential factors are considered in developing plans for hospital services. These factors are (1) the existing system, (2) subcounty growth areas, (3) accessibility (financial, temporal, and cultural including impact of hospital location on primary care and the implications of manpower availability), (4) cost-effectiveness, (5) accessibility of specialty services, and (6) past demand for hospital services. The first section of this document is a detailed discussion of each of the six factors considered and is important preparation for reading the county plans. The second section is made up of four county plans, each reporting its task force recommendations and providing a review of that county in terms of the essential factors. A projection of current demand for services to 1986 is provided to serve as a baseline for decisionmaking. Final recommendations, including a projection of bed need, are then offered. Appendices include travel time to selected hospital locations; inventory of obstetrical and neonatal beds; FGHSA appropriateness reviews for open heart surgery and cardiac catheterization including the state's criteria, measurable standards, and discussion; 1986 population projections; hospital inventory and utilization statistics; bibliographies on midwifery, ambulatory surgery, and shared services. Exhibits, and tables are included.

HRP-0903853/0 PC **A03**/MF **A01**
South Carolina Statewide Health Coordinating Council, Columbia.
Cycle Statewide Guidance Materials (4th).
28 Jan 81, 45p

This planning guidance gives a general summary of the functions in the development of health plans for the Health Systems Agencies (HSAs), the State Health Planning and Development Agency (SHPDA), and the Statewide Health Coordinating Council (SHCC) of South Carolina. The guidance covers the responsibilities of the HSAs, the SHPDA, and the SHCC in the preparation of the plans; the sequence of planning for the development of the five major health plans; the schedule; a summary of Program Policy Notice 80-26 which discusses the expectations in plan development and plan implementation; the health systems plan/state health plan format and what should be included in each chapter division; data available to HSAs in South Carolina; and a list of the agencies that will receive a copy of this guidance.

N82-13651/6 PC **A03**/MF **A01**
Australian Radiation Lab., Melbourne.
Absorbed Dose to Active Red Bone Marrow from Diagnostic and Therapeutic Uses of Radiation.
S. B. Solomon, and N. D. Morris. Jun 80, 34p ARL-TR-021, ISSN-0157-1400

The method of calculation of the radiation doses to the active bone marrow from diagnostic radiography, fluorescopy and radiotherapy is described. The bone marrow dose arising from radiological procedures Australia was determined as part of a survey of population doses. The results of the calculations are compared with the results of other models of bone marrow dose for a number of diagnostic X-ray procedures.

PB82-132283 Mag Tape $125.00
National Center for Health Statistics, Hyattsville, MD.
Vital Statistics Natality Data, Local Area Summary, 1979.
Data file,
Robert Heuser, and Joseph D. Farrell. 1979, mag tape NCHS/DF-81/016
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB81-117046, and PB82-132291.

Vital statistics data relating to natality provide demographic and health data for births occurring during the calendar year. The data are based on information abstracted from birth certificates filed in vital statistics offices of each State and the District of Columbia. Prior to 1972, data are based on a 50-percent sample of birth certificates from all States. Beginning in 1972, data are based on 100 percent of the birth certificates from some of the States and on a 50-percent sample from the remaining States. The number of States from which 100 percent of the records are used has increased from 6 in 1972 to 42 in 1979 and these States are identified by data year in Appendix A of the tape documentation package. Demographic data include variables such as date of birth, age and educational attainment of parents, marital status, live-birth order, race, sex, and geographic area. Health data include such items as birth weight, gestation, prenatal care, attendant at birth, and Apgar score. The number of births and birth rates for selected demographic variables are published annually in Vital Statistics of the United States, Volume I, 'Natality'. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes. Specialized reports are published periodically in Vital and Health Statistics.

PB82-132291 PC **A04**/MF **A01**
National Center for Health Statistics, Hyattsville, MD. Div. of Vital Statistics.
Vital Statistics Natality Data, Local Area Summary, 1979. Tape Contents and Documentation Package.
1979, 66p NCHS/DF-81/016A
For system on magnetic tape, see PB82-132283.

Vital statistics data relating to natality provide demographic and health data for births occurring during the calendar year. The data are based on information abstracted from birth certificates filed in vital statistics offices of each State and the District of Columbia. Prior to 1972, data are based on a 50-percent sample of birth certificates from all States. Beginning in 1972, data are based on 100 percent of the birth certificates from some of the States and on a 50-percent sample from the remaining States. The number of States from which 100 percent of the records are used has increased from 6 in 1972 to 42 in 1979 and these States are identified by data year in Appendix A of the tape documentation package. Demographic data include variables such as date of birth, age and educational attainment of parents, marital status, live-birth order, race, sex, and geographic area. Health data include such items as birth weight, gestation, prenatal care, attendant at birth, and Apgar score. The number of births and birth rates for selected demographic variables are published annually in Vital Statistics of the United States, Volume I, 'Natality'. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes. Specialized reports are published periodically in Vital and Health Statistics.

PB82-132325 Mag Tape $365.00
National Center for Health Statistics, Hyattsville, MD.
Vital Statistics Natality Data, Detail, 1979.
Data file,
Joseph D. Farrell, and Robert Heuser. 1979, mag tape NCHS/DF-81/014
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB81-117046, and PB82-132333.

Vital statistics data relating to natality provide demographic and health data for births occurring during the calendar year. The data are based on information abstracted from birth certificates filed in vital statistics offices of each State and the District of Columbia. Prior to 1972, data are based on a 50-percent sample of birth certificates from all States. Beginning in 1972, data are based on 100 percent of the birth certificates from some of the States and on a 50-percent sample from the remaining States. The number of States from which 100 percent of the records are used has increased from 6 in 1972 to 42 in 1979 and these States are identified by data year in Appendix A of the tape documentation package. Demographic data include variables such as date of birth, age and educational attainment of parents, marital status, live-birth order, race, sex, and geographic area. Health data include such items as birth weight, gestation, prenatal care, attendant at birth, and Apgar score. The number of births and birth rates for selected demographic variables are published annually in Vital Statistics of the United States, Volume I, 'Natality'. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes. Specialized reports are published periodically in Vital and Health Statistics.

PB82-132333 PC **A05**/MF **A01**
National Center for Health Statistics, Hyattsville, MD. Div. of Vital Statistics.
Vital Statistics Natality Data, Detail, 1979. Tape Contents and Documentation Package.
1979, 87p NCHS/DF-81/014A
For system on magnetic tape, see PB82-132325.

Vital statistics data relating to natality provide demographic and health data for births occurring during the calendar year. The data are based on information abstracted from birth certificates filed in vital statistics offices of each State and the District of Columbia. Prior to 1972, data are based on a 50-percent sample of birth certificates from all States. Beginning in 1972, data are based on 100 percent of the birth certificates from some of the States and on a 50-percent sample from the remaining States. The number of States from which 100 percent of the records are used has increased from 6 in 1972 to 42 in 1979 and these States are identified by data year in Appendix A of the tape documentation package. Demographic data include variables such as date of birth, age and educational attainment of parents, marital status, live-birth order, race, sex, and geographic area. Health data include such items as birth weight, gestation, prenatal care, attendant at birth, and Apgar score. The number of births and birth rates for selected demographic variables are published annually in Vital Statistics of the United States, Volume I, 'Natality'. A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes. Specialized reports are published periodically in Vital and Health Statistics.

PB82-138538 CP **T08**
Triage, Inc., Plainville, CT.
Triage: Coordinated Delivery of Services to the Elderly.
Data file,
Julius Pellegrino, Paula Drochner-Karme, and Gloria Heinman. Mar 79, mag tape NCHSR/DF-81/018
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB81-135824, PB82-138546, PB82-138553, and PB82-138561.

The Triage Demonstration Project is a model project designed to overcome organizational and financial barriers inhibiting the provision of appropriate care to the elderly. Teams made up of a nurse clinician and a social worker performed assessment, service coordination, and monitoring functions. Services arranged by the teams were financed through a series of waivers on the use of Medicare funds. Between March 1974 when the first client was enrolled, and April 1978 when the program was closed to new clients, the project enrolled 2128 clients. The demonstration setting was the state of Connecticut Central Connecticut Planning Region. The complete data base is produced on three reels: two of which contain patient assessment and reassessment data; the third reel contains services utilization and cost data. The assessment/reassessment data includes a wide range of social, psychological, economic, health, medical and functional status about the 2128 clients participating in the demonstration. Reel ID No. 7275 contains four files, two of which are initial assessment data and two are SPSS programs used to generate descriptive statistics on the initial assessment data. Reel ID No. 8978 contains six files, five of which are periodic reassessment data and one is the SPSS program used to generate descriptive statistics and the reassessment data. Initial assessments were made on the total study population (N=2128) and a reassessment at the close of the project was made on those remaining after attrition (N=1404). Periodic reassessment six months apart for at least two years were made on a subset called Experimental group (N=307) of the total Triage population that entered the program during a specific time period (August 1976 - January 1977) and a non-equivalent Comparison group (N=195) chosen during the same time period from a different area of the state with demographic characteristics similar to the Triage demonstration area. Reel ID No. 8953 contains seven files of cost data derived from several sources: (1) payments made by the fiscal intermediary that reimbursed for services provided to Triage clients; (2) payments made for services not prescribed by the Triage teams and which were paid through third party on behalf of Medicare or Medicaid; (3) diaries of expenditures for services which clients maintained, generally self paid for non-covered services and supplies. The files are organized to facilitate either longitudinal or comparative analyses.

PB82-138546 PC **A22**/MF **A01**
Triage, Inc., Plainville, CT.
Triage: Coordinated Delivery of Services to the Elderly. Documentation of the Data Base. Volume I: Assessment Data. Volume II: Cost Data.
Rept. for Apr 74-Mar 79,
Paula Drochner-Karme, Joan L. Quinn, Barbara Hicks, Susan Manizza, and Deborah Paturzo. Dec 79, 518p NCHSR/DF-81/018A
Grant PHS-HS-02563
For system on magnetic tape, see PB82-138538. Prepared in cooperation with Connecticut State Dept. on Aging, Hartford.

The two Volumes constitute a comprehensive users manual pertinent to the use of the computerized data base produced for research purposes as part of the demonstration project entitled 'Triage: Coordinated Delivery of Services to the Elderly'. Volume 1 includes a brief description of the project history, setting, and operation; a discussion and copies of the data collection forms for patient assessment/reassessment; a outline of the inter-rater reliability tests and results; computer input record layout; file structure record format showing: record number, position, description and number of variable, field size, field and character type, missing data indicator, code and label. A listing of the SPSS programs used to generate descriptive statistics on the assessment/reassessment data is included in the documentation, as well as on the computer tape. Volume II deals with services utilization and expenditures. The data sources and data quality and limitations are discussed and copies of billing forms are included. The file structure record format is the same as for assessment/reassessment data. Volume II also illustrates a hierarchical file on the data generated by the OSIRIS IV program package.

PB82-138553 PC **A18**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
U.S. Public Health Service Hospital Study.
Final rept.,
David Kidder, Kathleen Calore, and Diane Hamilton. Nov 81, 402p NCHSR/DF-81/018B
Contract PHS-233-79-4001
For system on magnetic tape, see PB82-138538.

The PHS Hospital Study provides cost comparisons between U.S. Public Health (USPHS) hospitals and private sector (non-Federal) community hospitals. The study was undertaken in response to Congressional interest in hospital costs and the Departments' interest in reducing direct provision of medical care. The study analyzes the comparative costs of providing patient care in USPHS hospitals and community hospitals, estimates the potential Federal reimbursement costs if USPHS primary beneficiaries were treated in community hospitals, and develops estimates for USPHS staff and capital deficiencies. The contractor also prepared analyses of hospitalization, outpatient costs, staffing and capital investment plans for each of the eight USPHS hospitals using statistical regression techniques. When measured by inpatient costs per day or per admission USPHS hospital actual costs tended to be higher than costs for comparable services at community hospitals. Unit inpatient costs of staff physicians were lower than estimated physician costs in the private sector. USPHS hospitals compared more favorably to community hospitals when unit hospital and physician costs were combined. Capital costs of USPHS hospitals tend to be old relative to capital costs of community hospitals. The study showed it would be less costly for the Federal Government to treat USPHS primary beneficiaries in community hospitals if a cost based (and cost shared) reimbursement system like Medicare were used. The study did not deal with questions concerning ending Federal control over the hospitals or termination of the specific entitlement for provision of fully subsidized medical care to primary beneficiaries.

PB82-138561 PC **A03**/MF **A01**
Tuskegee Inst., AL.
Rural Primary-Emergency Care Systems Dynamics: A Study.
Final rept. 30 Jun 76-29 Jun 77,
Cornelius L. Hopper. May 80, 36p NCHSR/DF-81/018C
Grant PHS-HS-02293
For system on magnetic tape, see PB82-138538.

In response to issues focusing on rural health and decision making for seeking care, this study was structured to: (1) determine an adequate base of knowledge that depicts patterns of health care access characteristics for a rural Alabama area; and (2) to provide insight into the utilization and access patterns of the emergency room at the John A. Andrew Memorial Hospital. The study objectives were: (1) to establish a functional profile of the structurally and procedurally static emergency subsystem; (2) to measure the impact on this emergency subsystem of the introduction of an alternative primary care system; and (3) to measure and evaluate resultant changes in relation to system costs, patient costs, patient utilization, quality of care provided and implications for system restructuring. The examination of the Emergency Room (ER) profile acquired in this exploratory study indicates that additional measures are needed to improve the integrity and relevancy of ER data in order for it to have utility in the more comprehensive study. By exploring the nature and quality of existing ER information, the development of a research design was addressed that prospectively took into consideration the utilization experience of the ER as compared with the utilization of the primary health care system, with additional determinations being made regarding the reasons for any changes from the client's perspective. The earlier the intervention point along the spectrum and the greater the effectiveness, the less will be the demand for emergency care and rehabilitation services upon the medical and hospital practice system.

PB82-141680 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
The Effects an Administrative Aid Has on a Nursing Care Coordinators' Duties,
Mary L. Barnwell. 30 Jun 78, 72p VA/NPR-131
Prepared in cooperation with Audie L. Murphy Memorial Veterans Administration Hospital, San Antonio, TX.

The descriptive study attempts to determine the effect an Administrative Aid (AA) or Unit Manager for nonnursing functions, would have on increasing the amount of time a Nursing Care Coordinator (NCC) or Head Nurse would have to spend on patient care. The study found that the AA greatly relieves the NCC of non-nursing activities and time for patient care is increased. Further, the time is being spent for patient care as intended. Further studies, including time and motion studies of both AA and NCC are recommended. Use of the Administrative Aid at other health care facilities is recommended. Sample questionnaires and references are included.

PB82-141706 PC **A03**/MF **A01**
Veterans Administration, Washington, DC. Dept. of Medicine and Surgery.
Veterans Administration Personal Care Home Program: Characteristics of Current and Potential Users.
May 79, 29p VA/79-5034

A survey taken in November 1978 was designed to describe the characteristics of the current personal care home user population, to identify and characterize potential users and to examine the possibility of program expansion. The survey revealed that 12,000 persons were placed in personal care homes, and that an equal number of institutionalized patients met the requirements for personal care home placement. However, about 2/3 of the potential users had income levels below the cost of the program. Other factors, such as refusaL to accept placement, or lack of a program at the facility were also barriers to placement. Present and potential users are compared in terms of diagnosis, income, age, and marital status. Expansion of the Personal Care Home Program is related to many issues.

PB82-142456 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
Dentistry Service Oral Examination Requirements in VA Hospitals: A Study of Degree of Compliance with Regulations. Data from Department of Medicine and Surgery's Annual VA Hospital Census October 18, 1972.
Information bulletin.
Mar 75, 52p VA/IB-16-1

The monograph brings together the demographic and medical characteristics of the '1972 Hospital Census Population' as they pertain to dental care of patients in Veterans Administration (VA) hospitals. Adherence to the regulation that an initial comprehensive oral examination be accomplished at admission with re-examination at six month intervals was studied. Numerous statistical tables list the results of this study. Highlights include: 70.5 percent of the patients in VA hospitals on the 1972 census day received an initial oral examination within 6 months prior to the census date; over three quarters of those examined were found to have a dental disease; dental care was prescribed for 85.9 percent of the VA hospital patients who had dental disease or disability; 67.3 percent actually had the dental work started. Suggestions are made for further monitoring of the oral examination program and for analysis of the results of the census data.

PB82-142514 PC **A05**/MF **A01**
Veterans Administration, Washington, DC.
The Inspector General Semi-Annual Report Number 5, 1 October 1980-31 March 1981.
30 Apr 81, 77p VA/81-5056

This report gives the findings and recommendations of the Inspector General audit, pointing out problems and deficiencies in Veterans Administration (VA) programs and departments. Benefit program accounts are listed, and the figures for the VA programs are given, including student and home loans. Medical program costs and their implications are given. The amounts spent for procurement, construction, consulting services and financial operations are included together with recommendations for better use of the money. A list of audit reports completed, both internally and external contractors is given. Statistics are included for the Inspector General's Employee Hotline.

PB82-142605 PC **A07**/MF **A01**
Veterans Administration, Washington, DC.
Proceedings of the Veterans Administration Cooperative Studies Program Symposium (2nd) Held at the Palmer House, State and Monroe, Chicago on September 21-22, 1978.
1978, 150p VA/78-5069

This publication includes papers presented at the Second Veterans Administration (VA) Cooperative Studies Program Symposium, 1978. Several papers on the general subject of cooperative studies were presented, including a report on the VA Cooperative Studies Program. The planning and ongoing phases of cooperative studies were discussed by several participants, including clinical trial design, sample size determination, and data management. Analysis of survival and categorical data was discussed, as well as the prediction and significant correlation of data. Experiences of a study chairman and of a clinical cooperative study participant were related.

PB82-142969 PC **A15**/MF **A01**
Veterans Administration, Washington, DC. Dept. of Medicine and Surgery.
Multi-Level Care System: Report on Developmental and Operational Testing.
Oct 80, 345p VA/80-5035

This report concludes the first phase of the Veterans Administration (VA) Multi-Level Care (MLC) System operational testing. The MLC System attempts to meet the multiple management requirements of the VA in carrying out its primary mission of providing high quality medical service to veterans. The MLC System provides a comprehensive patient, resource utilization, and financial management information system that directly links patient care with cost accounting. Operational testing of the MLC System began in the ten medical centers of Medical Districts 6 and 13, which include Washington, DC, Maryland, West Virginia, and Ohio. The report discusses MLC System theory and development and the implementation and evaluation of MLC System components in the ten test medical centers. The report also presents findings of the System's demonstrated and potential capabilities for providing the VA with accurate and timely data and an infrastructure and operational procedures for improved management. The report includes decision options to bring the MLC System to operational readiness and the recommendation that the System be installed in the operational mode in medical centers which would become 'showcases' for the MLC System.

PB82-142985 PC **A02**/MF **A01**
Health Insurance Plan of Greater New York, NY.
Factors Related to the Treatment of Gallbladder Disease.
Executive summary (Final) 1 Mar 79-31 Jan 80,
William Ruberman. Apr 80, 25p NCHSR-81-245
Grant PHS-HS-03572

This research explores the factors related to cholecystectomy rates in medical groups of the Health Insurance Plan of Greater New York and estimates the pro-

potion of patients with gallbladder disease who were operated on within a 3 to 4 year period after first diagnosis. Comparison of HIP cholecystectomy rates with total U.S. rates showed that the HIP rate for men was about 3/5 of that for all U.S. men, while for women the HIP rate was less than half the U.S. rate. The rates were higher for women than for men, and increased with age for each sex. Among the 28 HIP medical groups cholecystectomy rates ranged from a low of 0.3 to a high of 1.9 procedures per 1,000 prsons. No outstanding correlates of cholecystectomy rates were found within the medical groups of HIP. The factors considered as possible influences on the variation were primarily rates for other types of medical service in the groups. Groups with higher rates also had higher rates for other services; age and qualifications of surgeons did not differ; in the high rate groups, surgeons tended to use fewer hospitals for their cholecystectomies, and the authors speculate that this may indicate greater control over and thus easier access to hospital beds.

PB82-143041 PC **A06**/MF **A01**
Veterans Administration, Washington, DC.
The Effectiveness of Intervention by the Community Health Nurse Coordinator for Increasing Nursing Care Referrals,
Alice T. deSantis. Mar 81, 112p VA/NPR-150

The study attempted to determine the most effective intervention by the Community Health Nurse Coordinator (CHNC) to increase the number of nursing care referrals by nurses at the WJB Dorn Veterans Hospital. The position of Community Health Nurse Coordinator was initiated in Septe nber 1980 in order to coordinate patient care from the hospital to the community. Three methods of intervention were initiated by the CHNC in order to determine which was most effective in increasing referrals for nursing care at home. Advantages to nursing care at home are given. Questionnaires were given to nurses to determine their attitudes toward discharge planning. The results of the study showed that intervention by the CHNC did increase the number of nursing care referrals, although the method of intervention did not affect results. A bibliography and sample questionnaires are included.

PB82-143454 PC **A09**/MF **A01**
Veterans Administration, Washington, DC. Dept. of Medicine and Surgery.
Health Services Review Organization Systematic External Review Program: Standards, Criteria, Evaluative Algorithms and Measuring Instruments (SCEM).
Jul 80, 198p VA/80-5065

The Veterans Administration (VA) Health Services Review Organization (HSRO) contains a major evaluation process, Systematic External Review Program (SERP). SERP methodology involves the use of a set of standards, criteria, evaluative algorithms and measuring instruments (SCEM) for the review of each VA health care facility. This document provides pre-survey information, worksheets, and summary forms used by SERP surveyors. Services for which forms are provided include: dental, dietetics, laboratory, medicine, nursing, pharmacy, psychiatry, psychology, rehabilitation medicine, spinal cord injury, and surgery.

PB82-143462 PC **A02**/MF **A01**
Veterans Administration Medical Center, Little Rock, AR.
An Analysis of the Distribution of Overtime Hours,
Martha Ann Jurgensen. 1980, 18p VA/NPR-147

This retrospective study was conducted to demonstrate the distribution of overtime in 1979 in the Veterans Administration Medical Center, Little Rock, Arkansas. The total distribution of hours of overtime was analyzed, and comparisons between the two divisions studied were made. The reasons for overtime use were investigated, and several suggestions are made for minimizing it, including the possibility of part-time positions and possible redistribution of staff.

PB82-143488 PC **A03**/MF **A01**
Veterans Administration Medical Center, Washington, DC.
A Criteria-Based Checklist for Documentation of the Nursing Process,
Wynona B. Timmons. Apr 81, 35p VA/NPR-152

This report provides an extensive checklist for the use of the nurse at admission and throughout the nursing process. Assessment of the patient at admission, nursing diagnosis and planning to determine nursing interventions, implementation of the plan of care, as well as evaluation of the care plan to be certain that the outcome of the written plan had been met are the components of the nursing process. The long-term expected outcome utilizing the checklist will be to enrich the quality of care given to the patient.

PB82-143561 PC **A23**/MF **A01**
Florence Heller Graduate School for Advanced Studies in Social Welfare, Waltham, MA.
Implementation and Federal Child Health Policy.
Final rept. 1 Sep 79-30 Apr 81,
Andrew F. Coburn. c1982, 530p NCHSR-82-2
Grant PHS-HS-03664
Doctoral thesis.

This study examines the transition from federal to state administration of the Maternal and Infant Care and Children and Youth Projects under the 1967 amendments to title V of the Social Security Act. Analysis of legislative intent and case studies in the states of Massachusetts, Utah, Michigan, and South Carolina were used to assess whether federal policy objectives have been achieved and to identify critical factors affecting federal and state performance in the implementation of the amendments. Study results demonstrate considerable variation in state responses and performance in the implementation and administration of the special projects and raise serious questions concerning the extent to which federal expectations have been met. Among the key factors explaining variations in State performance were problems in the design and implementation of the amendments at the federal level, the degree of State support, executive leadership and degree of interagency cooperation in the implementation process.

PB82-143595 PC **A02**/MF **A01**
Temple Univ., Philadelphia, PA.
An Evaluation of Changing Patterns of Control of Nursing Homes.
Executive summary 30 Sep 77-30 Sep 79,
David Barton Smith. Dec 80, 13p NCHSR-81-243
Grant PHS-HS-02694

Consumer groups successfully spurred regulatory reforms of New York's nursing home industry in the mid-1970s. Those initiatives had the greatest impact on professional standards, reimbursement mechanisms, and criminal enforcement. For example, the reforms intensified the use of such techniques as management assessment, which more closely linked reimbursement to the standard setting and surveillance. This capped the rapidly expanding growth of licensed nursing homes, and kept relatively constant the number of beds between 1975 and 1980. The reforms also affected reimbursement. Restrictions in capital cost reimbursement eliminated incentives for real estate speculation in nursing homes, while other kinds of controls dampened Medicaid cost increases. Criminal enforcement was an important feature of the new regulations. An independent, well-financed enforcement unit was set up, and fines and jail sentences were imposed. This created fear of prosecution as a new form of control. Attempts to enhance consumer controls in nursing homes were instituted, and included such measures as legislative and administrative mechanisms for protecting patients' rights. However, changes resulting from increased consumer input had relatively little impact compared to reforms in other areas. Current concerns include preventing erosion of the consumer controls that had been so hard to obtain, and assuring the responsiveness of nursing homes and regulatory agencies.

PB82-145103 PC **A99**/MF **A01**
North Carolina Univ. at Chapel Hill. Dept. of Health Administration.
Impact Evaluation of Programs for Mothers and Infants: Implications from an Evaluation of the Maternity and Infant Care Project in North Carolina. Executive Summary.
Final rept. 1 Jul 80-30 Jun 81,
Mary Dennis Peoples. c1981, 654p NCHSR-82-3
Grant PHS-HS-04242

Despite obvious needs for impact information on which to base policy and management planning decisions, few well-controlled impact evaluations of programs for mothers and infants, particularly Maternity and Infant Care (MIC) Projects, have been conducted because of the inadequacy of evaluation methods and data utilization. To address these problems, two interdependent investigations were conducted. The first was a conceptual analysis which involved identification of key methodological problems, selection of the most rigorous and feasible methods and assessments of the chosen techniques when applied in the second investigation: an evaluation of the MIC Project in North Carolina. The evaluation was designed to determine the impact of the Project on utilization of prenatal care and pregnancy outcomes. Two quasi-experimental designs (a 1970-1977 post-test design with two comparison groups and a 1952-1978 multiple time series design) were used in conjunction with vital statistics data and weighted least squares and piecewise regression analysis to test four major hypotheses. Evaluation results suggested that the Project was successful in: (1) increasing the proportion of women who initiated care during the first two trimesters of pregnancy; (2) improving the quantitative adequacy of care; (3) reducing the incidence of fetal mortality; and (4) reducing the incidence of low birthweight deliveries.

PB82-145897 PC **A03**/MF **A01**
Professional Staff Association of Los Angeles County Harbor-UCLA Medical Center, Torrance, CA.
Mechanism of Hypotension Occurring During Chronic Dialysis.
Final rept. 1 Jan 78-31 May 80,
Warren D. Davidson. 15 Dec 81, 44p AK-1-8-2209-F
Contract N01-AM-8-2209

During the period covered by this contract several studies were undertaken in human subjects to determine: (1) the effects of acetate vs. bicarbonate hemodialysis on blood pressure control in chronic hemodialysis patients, (2) the effects of acetate vs. bicarbonate hemodialysis on pressor hormone (vasopressin, renin, catecholamines) levels during hemodialysis, (3) the metabolic fate of arginine vasopressin, a pressor hormone, in patients with end-stage renal disease, and (4) the effects of acetate vs. bicarbonate hemodialysis on dialysis-induced hypoxemia.

PB82-152232 PC**$15.00**/MF **A01**
National Library of Medicine, Bethesda, MD.
Memoirs of an Old Physician,
Adolf Kussmaul. 1981, 366p TT-78-52022
Trans. of German mono. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The name of Adolf Kussmaul is known to all physicians and students of medicine because it is associated with the peculiar breathing that may occur in severe cases of diabetic acidosis. He was born in 1822 into a medical family. Because he had access to his father's notebooks as well as to his own, he was able to portray medical life in Germany for a period covering a good part of the nineteenth century. Tucked into his many descriptions of German life are some acute observations of the country and of the German character. There are many hidden pearls of wisdom throughout this volume. Some have as much cogency for our own time as they did at the turn of the century.

PB82-861212 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Breast Tumor Immunology. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for 1978-Jan 82.
Jan 82, 208p

This bibliography contains citations concerning the immunological aspects of human breast tumors. Tumor associated antigen (TAA) and its binding to lymphocytes is discussed. Also considered are the leukocyte adherence inhibition test (LAI), serum IgA, IgG, and IgM and the monocyte maturation test and how they relate to the presence of breast cancer and its prognosis. HLA frequencies are also noted. (Contains 193 citations fully indexed and includes a title list.)

PB82-861659 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plasmapheresis. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for 1978-Jan 82.
Jan 82, 104p
Supersedes PB81-858391.

This bibliography contains citations concerning the use of plasmapheresis for the treatment of autoim-

mune and other immunological disorders. The effects this treatment has on patients with diverse conditions are considered. (This updated bibliography contains 109 citations, 34 of which are new entries to the previous edition.)

PB82-861881 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Pneumoconiosis. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for 1978-Jan 82.
Jan 82, 97p
Supersedes PB81-861130.

This bibliography contains citations concerning the lung diseases generally termed pneumoconiosis. Anthracosilicosis, asbestosis, silicosis, and byssinosis are most prominently mentioned. Chest radiography studies and pulmonary function studies are considered. Studies on HLA phenotypes and their relation to the disease are also discussed. (This updated bibliography contains 88 citations, 21 of which are new entries to the previous edition.)

PB82-930000 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
A Subscription to the Complete Set of Cancergrams.
1982, approx. 1284 issues
Supersedes PB81-930000.
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies.

This subscription item makes available all of the cancergrams released yearly by the International Cancer Research Data Bank Program of the U.S. National Cancer Institute. Every few weeks updated cancergrams containing abstracts of selected cancer-related articles recently published in more than 1500 journals are announced. There are 107 different cancergrams topics available. The broad breakdown of these topics is as follows: Specific types of viruses; mechanism of viral carcinogenesis; other cancer biology topics; cancer immunology; cancer biochemistry and endocrinology; other cancer biology; types of carcinogenic agents; human carcinogenesis; carcinogenesis of specific organ sites; mechanism of carcinogenesis; detection and screening; diagnosis and therapy of specific types of cancer; specific therapeutic and diagnostic; and other aspects of cancer therapy.

PB82-935700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Gastrointestinal Tract.
Cancergram CK09.
1982, 12 issues
Supersedes PB81-935700.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This is an organ-specific Cancergram that deals with carcinogenesis in the esophagus, stomach, small intestines, colon, and anus of both humans and experimental animals. The scope includes the occurrence and etiology of gastrointestinal cancer in the human population, the occurrence and induction of gastrointestinal cancer in experimental animals, carcinogenic mechanisms, and the biological, physiological and morphological aspects of the development of gastrointestinal cancer. This Cancergram specifically excludes studies of carcinogenesis of the buccal cavity, liver, gallbladder, bile ducts, and pancreas, which will be covered in other Cancergrams. It also generally excludes studies of diagnosis, treatment, and the pathology of gastrointestinal cancer, except where such studies contribute to the understanding of the carcinogenic process. These clinical aspects are covered by Cancergrams CT107 (Colo-Rectal Cancers) and CT19 (Upper Gastrointestinal Tumors).

PB82-935800 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Mechanisms of Carcinogenesis: Activation and Metabolism of Carcinogens.
Cancergram CK08.
1982, 12 issues
Supersedes PB81-935800.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This is the first of a series of mechanism-oriented Cancergrams, and deals with the initial metabolic events occurring after exposure to chemical carcinogens. The scope includes the activation, metabolism, and detoxification of carcinogens; the biochemistry of carcinogen metabolites; the role and induction of enzymes in carcinogen metabolism; the role of metabolic activation in carcinogen screening tests; and other related studies. Macromolecular binding of carcinogen metabolites is included only where the studies provide evidence for metabolic activation or information about the chemistry of the metabolites; a comprehensive treatment of macromolecular binding is included in the second Cancergram of this series, CK11.

PB82-936000 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Mechanisms of Carcinogenesis: Macromolecular Alteration and Repair.
Cancergram CK11.
1982, 12 issues
Supersedes PB81-936000.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the interaction of carcinogens and their metabolic products with macromolecules of the cell. The scope includes macromolecular binding of carcinogens, other macromolecular alterations by carcinogens, repair or reversal of macromolecular alterations, enzyme systems involved in repair or reversal, effects of macromolecular alteration on cell function (exclusive of malignant transformation), and genetic aspects of repair of damaged macromolecuels, including the human disease, xeroderma pigmentosum. By extension, the Cancergram also covers studies of the interaction in vitro of carcinogens with natural or synthetic macromolecules. The scope excludes all studies of carcinogen metabolism, which is covered in Cancergram CK08, and also excludes studies of carcinogen binding to macromolecules where the purpose of the binding data is only to provide evidence of the existence of metabolic activity.

PB82-936100 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Mammary Gland.
Cancergram CK12.
1982, 12 issues
Supersedes PB81-936100.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers the occurrence, etiology, and introduction of mammary cancer in both humans and experimental animals. The roles of chemical and physical agents, exogenous and endogenous hormones, viral and infectious agents, individual personal practices, and genetic and constitutional states are all considered under the etiology and induction of tumors. The Cancergram also includes studies of possible mechanisms of carcinogenesis, cancer prevention measures, and immunological, biochemical, physiology, and morphological aspects of carcinogenesis in the breast. General studies of cancer biochemistry, immunology, physiology, or morphology, are included on a selective basis. This Cancergram generally excludes studies of diagnosis, treatment, and pathology of breast cancer, as these topics are covered by Cancergram CT09.

PB82-936200 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Modification of Carcinogenesis.
Cancergram CK04.
1982, 12 issues
Supersedes PB81-936200.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of modification of the basic carcinogenic process, including tumor promotion, cocarcinogenesis, anticarcinogenesis, synergism or antagonism between carcinogens, interaction of carcinogens with viruses, effects of carcinogens on the immunological and endocrine systems, and the effects of diet, genetic factors, hormones, immunological status, and environmental stress on the action of carcinogenic agents. The Cancergram includes studies of mechanisms of modification of carcinogenesis and selected papers on mechanisms of carcinogenesis or cancer biology where the results indicate the possibility of modification of the process. The major emphasis is on studies in model systems, although studies pertaining to possible interaction of etiologic factors in human cancer are also included. This Cancergram generally excludes studies of cancer therapy.

PB82-936300 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Liver.
Cancergram CK16.
1982, 12 issues
Supersedes PB81-936300.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the etiology of cancer of the liver and biliary tract. Areas covered include occurrence and presumptive cause of hepatic cancer in the human population, experimental induction and modification of hepatic cancer, and morphological, biochemical, and other biological effects associated with the induction, development, or occurrence of hepatic cancer. Metabolism of known or suspected specific hepatocarcinogens is covered, but carcinogen metabolism is otherwise excluded, since this is the subject of Cancergram CK08. This Cancergram includes studies of biological or pathological phenomena associated with the presence of hepatic cancer, but generally excludes studies specifically related to diagnosis or treatment.

PB82-936600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Kidney and Urinary Tract.
Cancergram CK17.
1982, 12 issues
Supersedes PB81-936600.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers all aspects of the etiology of cancer of the kidney and urinary tract. Areas covered include occurrence and presumptive cause of urinary tract cancer in human populations, experimental induction and modification of urinary tract cancer, and morphological, biochemical, and other biological effects associated with the induction, development, or occurrence of urinary tract cancer. This Cancergram specifically excludes carcinogenesis studies of the prostate, testes, scrotum, or penis, which are covered in Cancergram CK18 (reproductive tract carcinogenesis). Studies concerning diagnosis, therapy, and pathology are generally excluded except where they contribute to the understanding of kidney and urinary tract carcinogenesis. Related clinical studies are the subject of Cancergram CT16, entitled Genito-urinary Cancers--Diagnosis, Treatment.

PB82-936700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Respiratory Tract.
Cancergram CK15.
1982, 12 issues
Supersedes PB81-936700.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the etiology of cancer of the respiratory tract, including the lungs, bronchi, trachea, larynx, and nasopharynx. Also included are carcinogenesis studies involving the buccal cavity, salivary glands, and lips, when apparently related to inhalation of carcinogens. Areas covered include occurrence and presumptive cause of respiratory tract cancer in human populations, experimental induction and modification of respiratory tract carcinogensis, and morphological, biochemical, and other biological phenomena associated with the induction, development, or modification of respiratory tract cancer. A special category deals with the relationship of tobacco

and smoking to respiratory tract cancer. Tobacco-related carcinogenesis involving other organ sites is covered in other Cancergram series, such as CK17 on kidney and urinary tract carcinogensis. Other abstracts dealing with the analysis and more general carcinogenic properties of tobacco smoke are included in Cancergram CK13. Clinical diagnosis and treatment of lung cancer is covered in Cancergram CT08, and of head and neck cancer in Cancergram CT11.

PB82-936800 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Short Term Test Systems for Carcinogenicity and Mutagenicity.
Cancergram CK19.
1982, 12 issues
Supersedes PB81-936800.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram concerns short-term, rapid tests or assays which screen for the carcinogenicity or mutagenicity of chemicals or other agents. This scope covers the experimental designs and specificities, modifications, and improvements in methodologies, and selections of test vehicles for short-term assays. In addition to reviewing the development of standard procedures, this Cancergram includes the development of reporting standards for mutagen and carcinogen tests. Straightforward test results, reviews, and evaluations of test systems are also covered. This Cancergram specifically excludes studies which use short-term test systems to investigate the molecular mechanisms of carcinogen metabolism or activation, or the molecular interaction of carcinogens/mutagens with macromolecules, as these topics are covered by Cancergram series CK08 (Activation and Metabolism of Carcinogens) and CK11 (Macromolecular Alteration and Repair).

PB82-936900 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Reproductive Tract.
Cancergram CK18.
1982, 12 issues
Supersedes PB81-936900.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the occurrence, induction, and development of cancer of the male and female reproductive systems, including both principal and accessory sex organs. Subject areas include the occurrence of etiological factors contributing to reproductive tract cancer in humans, experimental induction and modification of reproductive tract cancer, and hormonal, immunological, viral, biochemical, physiological, and other aspects of reproductive tract cancer. Morphological and pathological studies related to cancer screening or cancer control are included, but clinical diagnosis and pathology, treatment, and management of reproductive tract cancer are covered elsewhere, in Cancergrams CT16 (genitourinary) and CT17 (gynecologic). This Cancergram also covers transplacental carcinogenesis, including teratological effects of known or suspected carcinogens or mutagens, but otherwise excluding teratogenesis as a general subject.

PB82-937000 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Lymphatic and Hematopoietic Tissues.
Cancergram CK20.
1982, 12 issues
Supersedes PB81-937000.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers the occurrence, induction and development of lymphoreticular malignancies, both in humans and in animals. Cancers considered include acute and chronic leukemias, lymphomas, plasmacytomas and such predisposing neoplastic conditions as polycythemia vera. Relevant epidemiological studies are included. Emphasis is placed on experimental studies of lymphatic and hematopoietic carcinogenesis by viruses, irradiation and chemical agents in test animals, and on related studies of transformation in cell cultures. Studies concerning properties of transformed lymphatic or hematopoietic cells are included where they shed light on aspects of lymphoreticular carcinogenesis. These studies include viral, biochemical, immunological, morphological and cytogenetic characterizations of malignant lymphoreticular cells. Oncogenic progression from benign neoplastic conditions to lymphoreticular malignancy is considered. This Cancergram specifically excludes studies of the diagnosis, treatment, and control of lymphatic or hematopoietic cancers, as these topics are covered by Cancergrams CT03, CT05 and CT13.

PB82-937600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cancer Detection and Management: Nuclear Medicine.
Cancergram CT02.
1982, 12 issues
Supersedes PB81-937600.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the clinical use of radionuclides or nuclear medicine techniques in the care of cancer patients. It also includes any preclinical studies of various radionuclides or techniques considered to have direct clinical diagnostic relevance. Other basic biologic, pharmacologic, or metabolic studies where radionuclides are used as tracers will generally be excluded. Radiotherapy is covered by Cancergram CT15, and Diagnostic Radiology by Cancergram CT14.

PB82-937700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Acute and Chronic Leukemia: Diagnosis, Treatment.
Cancergram CT03.
1982, 12 issues
Supersedes PB81-937700.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers both acute and chronic leukemia in all of its forms (acute lymphocytic, acute monocytic, acute or sub-acute granulocytic, chronic granulocytic, chronic lymphocytic, chronic monocytic, plasma cell, stem cell, and hairy cell). Other neoplastic conditions of the reticuloendothelial system, lymphatic system, spleen, multiple myeloma, macroglobulinemia, and other monoclonal gammopathies are excluded, since they are covered by Cancergram series CT05 and CT13. This Cancergram includes abstracts concerning all clinical aspects of the disease, such as diagnosis and staging, supportive care, evaluation, and therapy. Animal models, tissue culture experiments, carcinogenesis, and other preclinical studies are generally excluded, except those considered to have direct clinical relevance.

PB82-937900 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Lymphomas: Diagnosis, Treatment.
Cancergram CT05.
1982, 12 issues
Supersedes PB81-937900.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The scope of this Cancergram includes Hodgkin's disease, adenolymphoma, Burkitt's lymphoma, lymphosarcoma, lymphoblastoma, lymphocytoma, reticulum cell sarcoma, mycosis fungoides, and any not otherwise specified lymphoma. Abstracts are included which concern all clinical aspects of the various forms of lymphoma, such as diagnosis and staging, supportive care, evaluation, and therapy. Animal models, tissue culture experiments, carcinogenesis and other preclinical studies are generally excluded, except for those considered to have direct clinical relevance.

PB82-938000 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Clinical Cancer Immunology and Immunotherapy.
Cancergram CT06.
1982, 12 issues
Supersedes PB81-938000.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

Clinical trials employing immunotherapy frequently involve patients with many different types of cancer. Accordingly, this Cancergram focuses on the immunotherapy employed rather than the disease diagnosis. Adoptive, active specific, and active nonspecific immunotherapy, as well as the agents used in these modes, are included. Also in scope are other approaches to immunotherapy such as immune stimulation and immune potentiation. Immune suppression, immune deficiency, immune competence, and other aspects of clinical immunology are included. Immunodiagnostic techniques are covered by a separate Cancergram series, CT01. Animal models, tissue culture experiments, carcinogenesis, and other preclinical studies are generally excluded, except for those considered to have direct clinical relevance.

PB82-938100 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Colo-Rectal Cancers: Diagnosis, Treatment.
Cancergram CT07.
1982, 12 issues
Supersedes PB81-938100.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers clinical aspects of cancers of the anatomical region included from the appendix downward to the anus. Studies of the small bowel, excluded here, appear in Cancergram CT19, Upper Gastrointestinal Tumors. Abstracts included here concern clinically relevant aspects of the prevention, detection, evaluation, diagnosis, and therapy of colonic neoplasms in humans. With certain exceptions, the topic excludes general carcinogenesis, animal system studies, or general preclinical studies not directly relevant to clinical applications. Related carcinogenesis studies are covered by Cancergram CK09.

PB82-938200 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Lung Cancer: Diagnosis, Treatment.
Cancergram CT08.
1982, 12 issues
Supersedes PB81-938200.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers clinical aspects of cancers of the lung and tracheo-bronchial tree, i.e., the lower respiratory tract. This includes primary lung cancer in both early and advanced disease states. The topic includes clinically relevant aspects of the prevention, detection, diagnosis, evaluation, and therapy of lung cancer. Certain aspects of metastatic lung disease treatment or therapy which involve aspects of interest to primary lung cancer are included. With certain exceptions, general preclinical or animal studies not directly relat-

ratory tract carcinogenesis is covered by Cancergram CK15.

PB82-938300 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Breast Cancer: Diagnosis, Treatment, Preclinical Biology.
Cancergram CT09.
1982, 12 issues
Supersedes PB81-938300.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers clinical aspects of cancers of the mammary glands, the fat pads, and the supporting tissues. Abstracts included concern certain specific types of neoplasms which occur in the breast, and in ancillary tissues related to the breast (axillary lymph nodes, etc.). Also included are selected studies on receptors and the physiological aspects of lactation, pregnancy, and ontogeny related to cancer of the breast. The topic includes clinically relevant aspects of the prevention, detection, diagnosis, evaluation, and therapy of breast cancer. With certain exceptions, preclinical studies of tissue culture systems, or animal

model studies which are not directly related to primary human disease are excluded. Related breast carcinogenesis studies are covered by Cancergram CK12.

PB82-938400 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Pediatric Oncology.
Cancergram CT10.
1982, 12 issues
Supersedes PB81-938400.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The concept of this topic includes childhood tumors of the kidney, brain and CNS system, lymphomas and sarcomas, and other soft tissue tumors. Abstracts concerning childhood leukemias are included only on a very selective basis, as the topic is comprehensively covered by Cancergram series CT03. This Cancergram covers clinically relevant aspects of the prevention, detection, evaluation, diagnosis, and therapy of solid tumors in children. With certain exceptions, the topic excludes animal studies, general preclinical studies, and general carcinogenesis studies, not directly relevant to clinical applications.

PB82-938500 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Neoplasia of the Head and Neck: Diagnosis, Treatment.
Cancergram CT11.
1982, 12 issues
Supersedes PB81-938500.
Paper copy available on subscription, North American Continent price $24.00/year; all other write for quote. Also available in single copies.

The Cancergram covers clinically relevant aspects of tumors associated with the head and neck regions. This concept excludes brain and CNS neoplasms, which will be covered in a subsequent Cancergram. Abstracts are included concerning the prevention, detection, evaluation, diagnosis, and therapy of head and neck tumors. With certain exceptions, the topic excludes animal or pre-clinical studies, general carcinogenesis, and pre-clinical tissue culture experiments not directly related to clinical applications.

PB82-938600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Clinical Evaluation and Treatment of Multiple Myeloma and Other Gammopathies.
Cancergram CT13.
1982, 12 issues
Supersedes PB81-938600.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram concerns the clinical aspects of multiple myeloma and related disorders, including macroglobulinemia, light-chain disease, heavy-chain disease, amyloidosis, the monoclonal gammopathies, and other dysproteinemias. Because of coverage by other Cancergrams, the scope excludes the leukemias (see Cancergram series CT03), and osteogenic sarcoma and other bone tumors (see Cancergram series CT12). This Cancergram covers diagnosis, staging, natural history, supportive care, evaluation techniques, and therapy. Selected abstracts will also be included concerning epidemiology, etiology, and other preclinical studies where they have direct clinical relevance.

PB82-938700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Sarcomas and Related Tumors: Diagnosis, Treatment.
Cancergram CT12.
1982, 12 issues
Supersedes PB81-938700.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram focuses on clinical aspects of sarcomas involving soft tissue and bone, and also includes abstracts on related malignant and benign tumors. Soft tissues are considered as all non-epithelial extraskeletal tissues of the body, with the exception of the reticuloendothelial system, the neuroglia, ad visceral and parenchymal organs. Included, therefore, are sarcomas of the vascular system, fatty tissues, muscle tissues, connective tissues, and synovial tissues. Bone tumors included are osteosarcoma, chondrosarcoma, adamantinoma, chondroblastoma, Ewing's sarcoma, and other benign and malignant disorders of the bone. This Cancergram excludes disorders of the bone marrow, which are the subjects of separate Cancergrams (see series CT03 for leukemias and series CT13 for multiple myeloma). The scope includes diagnosis and staging, supportive care, evaluation, and therapy. Selected abstracts concerning epidemiology, etiology, and other preclinical studies will also be included where they have direct clinical relevance.

PB82-938800 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Genito-Urinary Cancers: Diagnosis, Treatment.
Cancergram CT16.
1982, 12 issues
Supersedes PB81-938800.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram provides access to current oncology information concerning the male genital tract and the male/female urinary tract. It excludes the female genital tract, which is covered in Cancergram CT17. The scope includes both common and rate GU tumors, and certain tumor types which occur at GU sites nonspecifically. Abstracts included concern primarily the clinical aspects of GU tumors including case histories, etiology, epidemiology, detection, screening, diagnosis, therapy, and rehabilitation. Selected preclinical studies of special relevance to clinical situations will also be included. Related carcinogenesis studies are covered by Cancergrams CK17 (Kidney and Urinary Tract) and CK18 (Reproductive Tract).

PB82-938900 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Gynecologic Tumors: Diagnosis, Treatment.
Cancergram CT17.
1982, 12 issues
Supersedes PB81-938900.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram focuses on neoplastic conditions of the female reproductive system, including tumors of the ovary, fallopian tubes, uterus, cervix, vagina, and vulva. In addition, it covers trophoblastic neoplasia including trophoblastic cancer, hydatidiform mole, and the chorionic neoplasms. This Cancergram does not include tumors of the female urinary system, as these topics are covered by Cancergram CT16. Preclinical studies of animal models, tissue culture experiments, epidemiology, or etiology are generally excluded except for those considered to have direct clinical relevance. Carcinogenesis studies of the female reproductive tract are covered by Cancergram CK18.

PB82-939000 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Clinical Treatment of Cancer: Radiation Therapy.
Cancergram CT15.
1982, 12 issues
Supersedes PB81-939000.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers all forms of radiotherapy being used in the treatment of cancer, including standard X-ray, cobalt 60 and radium irradiation as well as high linear energy transfer (LET), megavoltage, electron beam treatment, and radioactive interstitial implants. Coverage of this topic includes adverse effects of radiotherapy, radiocurability, radiodosimetry, radiosensitization, and studies with specialized instrumentation such as the betatron and linear accelerator. Radiobiology, animal experiments, tissue culture experiments, carcinogenesis, and other preclinical studies will not be included except for those considered to have direct clinical relevance.

PB82-939100 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cancer Detection and Management: Diagnostic Radiology.
Cancergram CT14.
1982, 12 issues
Supersedes PB81-939100.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers the field of diagnostic radiology from amniography to xerography in all of its clinical applications. It also includes such closely related techniques as fluoroscopy, ultrasonography, and thermography. Areas of interest are the clinical applications of these techniques, instrumentation, comparative studies, and any preclinical studies that have direct clinical relevance. Radiation therapy, or the use of radioactive isotopes and other nuclear medicine techniques, are not in scope, as they are covered by Cancergrams CT15 and CT02, respectively.

PB82-939200 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
CNS Malignancies: Diagnosis, Treatment.
Cancergram CT18.
1982, 12 issues
Supersedes PB81-939200.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers clinical studies concerning all cancers of the brain and spinal cord nerves. Emphasis is upon site-related reports concerning screening, detection, diagnosis, and therapy. Abstracts pertaining to etiology, epidemiology, or other preclinical aspects of nervous system cancer are included only on a very selective basis. The scope of this Cancergram does not include general cancers of the head and neck, as these topics are covered by Cancergram CT11.

PB82-939300 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cancer Detection and Management: Biological Markers.
Cancergram CT01.
1982, 12 issues
Supersedes PB81-939300.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram provides research information on tumor markers of clinical importance. Tumor markers are here considered as any condition or parameter detectable in cancer patients which relates to the presence of a tumor. This includes any detection system related to tumor products, tumor product activity, or host responses to tumor products. Of specific interest are reports concerning markers for the risk, presence, extent, stage, or histological type of cancer in patients. This includes reports on new tests (marker candidates), the development or improvement of tests or techniques, and the clinical use and appraisal of such tests. As the emphasis is on clinically important markers, preclinical material lacking direct clinical importance is largely excluded.

PB82-939400 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Upper Gastrointestinal Tumors: Diagnosis, Treatment.
Cancergram CT19.
1982, 12 issues
Supersedes PB81-939400.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all clinical aspects of tumors of the esophagus, stomach, small intestine, liver, pancreas, gall bladder, and associated ducts. Emphasis is upon detection, diagnosis, and therapy, although selected preclinical studies with special relevance to clinical situations will also be included. Tumors of the lower gastrointestinal tract are the subject of a separate Cancergram CT07. Carcinogenesis study are covered by Cancergram CK09.

PB82-939500 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Endocrine Tumors: Diagnosis, Treatment, Pathophysiology.
Cancergram CT21.
1982, 12 issues
Supersedes PB81-939500.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers the clinical aspects of endocrine gland tumors, including detection, diagnosis, pathophysiology, and treatment. The Cancergram also offers selective coverage of the epidemiology and etiology of endocrine tumors, and related preclinical studies. The endocrine tumor surveyed include those associated with intra-site and extra-site tissues of the thyroid, parathyroid, pituitary, pineal, adrenals, pancreas, and gonads (primarily secretory aspects). Additionally, this will include appropriate paraganglia tissues. The thymus is excluded from the present scope of coverage. Clinical studies of gonadal cancers are comprehensively covered by Cancergrams CT16, Genito-urinary cancers, and CT17, Gynecologic tumors.

PB82-939600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Melanoma and Other Skin Cancer: Diagnosis, Treatment.
Cancergram CT22.
1982, 12 issues
Supersedes PB81-939600.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers all clinical aspects of malignant melanoma involving the skin, as well as other organ systems. Also covered are any other tumors arising in the skin or appendages of the skin, such as the sweat glands, apocrine glands, eccrine glands, or sebaceous glands. Epidermoid conditions, epithelioma, keratinizig conditions, and squamous cell, giant cell, and basal cell carcinomas of the skin are included. In addition, Paget's disease, Kaposi's sarcoma, and Letterer-Siwe disease are included when they involve the skin or its appendages. All clinical studies of the diagnosis, immunology, and treatment of these cancers are covered. Additionally, the Cancergram includes selected aspects of etiology and epidemiology, and preclinical studies in animal and in vitro systems which are directly relevant to clinical oncology. Mycosis fungoides is excluded, however, because it is covered by Cancergram CT05, Lymphomas.

PB82-939700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Rehabilitation and Supportive Care.
Cancergram CT20.
1982, 12 issues
Supersedes PB81-939700.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers physical and psychological rehabilitation of the cancer patient. This includes the use of prostheses and braces, physical therapy, speech therapy, orthoses, and occupational therapy. It will also cover psychological therapy and counseling of the patient as well as studies of the psychosocial effects of cancer on the patient and his family. Nutritional support and nursing care are two areas of supportive care which are covered. Included are studies of taste, nutritional status, caloric intake and expenditure, special diets and nutrients, parenteral feeding, and hyperalimentation in the cancer patient. All aspects of the nursing care of the cancer patient are covered by this Cancergram.

6F. Environmental Biology

AD-A108 378/1 PC **A02**/MF **A01**
Science and Education Administration, Gainesville, FL. Insect Affecting Man and Animals Research Lab.
Evaluation of Insecticides, Clothing Repellents, and Other Approaches to the Control of Coastal Sand Flies, Culicoides spp.
Annual rept. no. 2, 1 Oct 80-30 Sep 81,
Daniel L. Kline, and R. H. Roberts. 1 Nov 81, 24p
Contract N00014-79-F-0070

Population dynamics and control studies on Culicoides sand flies were continued at Parris Island, SC, and Yankeetown, FL. Adult seasonal patterns were monitored by NJ light traps. Five species, C. barbosai Wirth and Blanton, C. furens (Poey), C. hollensis Melander and Brues, C. melleus (Coquillett), and C. mississippiensis Hoffman are considered abundant. C. barbosai, C. furens and C. melleus are present from mid-April through late October; C. hollensis and C. mississippiensis peak in the spring and fall of the year. A comparison of several population survey techniques indicated that CDC-type traps baited with CO2 gas and used in conjunction with New Jersey traps should give a reliable estimate of Culicoides activity during chemical control tests. Twenty-one different larval habitats were identified at Parris Island. These data suggest that a properly timed effective larvicide could reduce adult emergence by 53% by treating 30% of the marsh. In chemical control studies, laboratory treated screens, field ground ULV and aerial ULV tests were conducted. NRDC-161 and permethrin gave ca. 100% mortality 168 days after the screens were treated at .125% A.I. (wt/vol. technical in acetone) for NRDC-161 and at .5% for permethrin. Deet-treated net jackets were tested in Panama and provided ca. 90% protection.

AD-A108 544/8 PC **A06**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Stronger Enforcement Needed against Misuse of Pesticides.
15 Oct 81, 107p Rept no. GAO/CED-82-5
Report to the Congress of the United States.

Programs enforcing Federal pesticide laws are key factors in making sure that the public and the environment are not unnecessarily exposed to hazardous pesticides. But these programs have not always been adequate. For example, the Environmental Protection Agency and the States do not always properly investigate cases and sometimes take questionable enforcement actions. EPA and States also have problems with the special registration program. In some cases, State agencies may be circumventing pesticide laws. EPA and States need to alleviate the problems that continue to plague the enforcement programs and improve their management to help ensure the public's protection. (Author)

ORNL-5666 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Environmental Sciences Laboratory Dedication, February 26-27, 1979.
S. I. Auerbach, and N. T. Millemann. Sep 80, 153p
Contract W-7405-ENG-26

The dedication of the new Environmental Sciences Laboratory coincided with the 25th year of the establishment of the science of ecology at Oak Ridge National Laboratory. That quarter century witnessed the evolution of ecology from an obscure, backwater discipline of biology to a broadly used, everyday household word. The transition reflected broad and basic changes in our social and cultural view of the world. This was brought about as a result of the awareness developed in our society of the importance of the environment, coupled with efforts of ecologists and other environmental scientists who identified, clarified, and formulated the issues and challenges of environmental protection for both the lay public and the scientific community. In many respects, the activities in ecology at ORNL were a microcosm of the broader social scene; the particular problems of the environment associated with atomic energy needed to be defined in scientific terms and articulated in both the specific and general sense for a larger audience which was unfamiliar with the field and somewhat alien to its concepts and philosophy. The success of this effort is reflected in the existence of the new Environmental Sciences Laboratory. This dedication volume brings together the thoughts and reflections of many of these scientists whose efforts contributed in a unique and individualistic fashion not only to ORNL but also to the national identification of ecology and its importance to the achievement of our national goals. Their remarks and presentations are not only a pleasant and personally gratifying recapitulation of the past and of ORNL's contributions to ecology but also portend some of the challenges to ecology in the future. (ERA citation 06:004134)

PB82-143819 PC **A02**/MF **A01**
Maryland Dept. of Natural Resources, Annapolis. Power Plant Siting Program.
A Computer Generated Description of Potential Bald Eagle Nesting Habitat in Maryland.
Final rept. 15 Feb 79-15 Aug 80,
Gary J. Taylor, and Glenn D. Therres. Oct 81, 18p
PPRP-55

The authors utilized the physical characteristics of known bald eagle nesting habitat in Maryland and the capabilities of an automated geographic referencing system (MAGI) to predict the location of potential bald eagle nesting habitat in Maryland. The authors predict that 28.4% of the land area of the coastal plain counties of Maryland may be potential bald eagle nesting habitat, and discuss potential uses and limitations of this information.

PB82-143827 PC **A03**/MF **A01**
Maryland Univ., Frostburg. Appalachian Environmental Lab.
Nesting Habitat and Nest Site Selection by the Bald Eagle in Maryland.
Final rept.,
James A. Mosher, and Jonathan M. Andrew. Jul 81, 47p PPSP/PPRP-48

Habitat at 70 bald eagle (Haliaeetus leucocephalus) nest sites was quantified and compared with evaluations at 139 random habitat plots located in the Chesapeake Bay region of Maryland. Bald eagles selected vegetationally open habitats near water and away from selected human activities relative to random habitat plots. Successful nest sites were located in denser forest stands farther from water and unoccupied structures than unsuccessful nest sites.

PB82-149238 PC **A13**/MF **A01**
National Research Council, Washington, DC.
Urban Pest Management.
Dec 80, 299p ISBN-0-309-03125-7
Contract EPA-68-01-2430
Library of Congress catalog card no. 80-83966.

Partial contents: Perspectives on urban pest management; Major urban pests; Management of urban pests; Economics of urban pest management; Urban pest management decision making.

PB82-803511 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Eutrophication. August, 1977-November, 1981 (Citations from the NTIS Data Base).
Jan 82, 261p
Supersedes PB80-814148, and NTIS/PS-79/0885.

The selected abstracts cover all aspects of eutrophication, including research on primary productivity, water chemistry, ecology, the influence and impact of nutrients on lakes and streams, control techniques, and mathematical modeling. (This updated bibliography contains 254 citations, 69 of which are new entries to the previous edition.)

PB82-803644 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Aquatic Weed Control. 1964-November, 1981 (Citations from the NTIS Data Base).
Jan 82, 296p
Supersedes PB80-814080, and NTIS/PS-79/0888.

The selected citations cover herbicide and biological weed control. The effects on water quality and ecology are discussed, as is the harvesting of these weeds. AY1 types of weeds are covered including algae blooms. (This updated bibliography contains 289 citations, 74 of which are new entries to the previous edition.)

6G. Escape, Rescue, and Survival

PATENT-4 187 570 Not available NTIS
Department of the Navy, Washington, DC.
Ship Escape and Survival System.
Patent,
David N. De Simone. Filed 17 Feb 78, patented 12 Feb 80, 7p AD-D009 030/8, PAT-APPL-878 556
Supersedes PAT-APPL-878 556-78, AD-D004 965.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a personnel evacuation and survival device for individual crewmen aboard ship having a quick don harness to which is attached a personnel lowering device and an automatically deployable encapsulating life raft. From an appropriate evacuation station aboard the ship, the crewman uses the device to suspend himself clear of the side and lower himself on a lifeline, the pay-out of which is controlled to provide a safe rate of descent. During the descent, a raft package is automatically released and a life raft is inflated which completely encapsulates the crewman prior to water entry.

6H. Food

AD-A108 142/1 PC **A03**/MF **A01**
Army Foreign Science and Technology Center, Charlottesville, VA.
Foreign Food Technology of Military Significance. Volume 5, Number 1,
Victoria Dibbern, and Alan Krome. 18 Dec 81, 35p DIA-DST-1810P-487-82-v5-1
See also Volume 4, Number 1, AD-A097 103.

Contents: Development of Simple Solar Dehydrators for Drying Fruit and Vegetable Products, Japanese Firm Markets Shelf-Life Extender, APV Company Introduces Aseptic Processing System for Particulate Solids, New Defence Food Labs for Australia, Soviet Military Menu Planning, Soviet PS-2 Food Storage Trailer, Nestle Develops Civil Defense Shelter Survival Rations, Japanese Study Foods Affecting Coronary Heart Disease Risk Factors, East German Nutrition Norms and Combat Ration, and Diet of Students at the Japan National Defense Medical College Analyzed.

AD-A108 375/7 PC **A08**/MF **A01**
Army Natick Research and Development Labs., MA.
An Evaluation of the New 'Multi-Restaurant' Food Service System for the Marine Corps.
Technical rept.,
M. Davis, P. Brandler, W. Wilkinson, H. Meiselman, and L. Birnbaum. Jul 80, 156p Rept no. NATICK/TR-81/023

This report contains an evaluation of the new 'multi-restaurant' concept designed and tested at the Marine Corps Air Ground Combat Center at Twentynine Palms, CA. The concept consists of eight outlets, three serving A-ration type meals, three serving specialty type meals (Steak, Italian, and Barbeque) and two offering short order menus such as hamburgers, hotdogs, french fries, etc. Each outlet has its own unique decor (theme) to complement the menu being offered. The results of the evaluation show significant increases in customer acceptance both from surveys and as reflected by a 30% increase in attendance, and also substantial improvement in worker attitudes towards their jobs. (Author)

PB82-138454 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Nationwide Food Consumption Survey, Puerto Rico, Household, 1977-78.
Data file,
Brucy C. Gray, and Mary Hama. 1978, mag tape USDA/DF-81/017
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

This file contains food and nutrient data of 3040 households of which approximately 98 percent (2967) are housekeeping households from the USDA 1977-78 Puerto Rico Food Consumption Survey collected during the winter of 1978. When the weights are applied, the total 2966 weighted samples are 3040 interviews. The data were collected by personal interviews with household member most knowledgeable about the household food consumption. A food list was used to help recall kinds, quantities, (converted to pounds) and costs of foods used from the household food supply during the 7 days prior to the interview. Counts of meals eaten at home and away from home were recorded for each household member, as well as for guests' meals and/or snacks served from household supply. Money value of all foods per household is summarized. For each food item reported, there are its conversion factor and nutritive value for food energy, protein, fat, carbohydrate, calcium, iron, magnesium, phosphorus, vitamin A value, thiamin, riboflavin, niacin, vitamin B12, vitamin B6, and ascorbic acid. Other information includes household sizes in equivalent nutrition units, nutritive values per nutrition unit, ratios of nutritive value per nutrition unit to the Recommended Dietary Allowances, and weekly aggregate nutritive values. Household income, education and employment of household heads, and other factors that might affect food consumption were reported. Accompanied are the data file format information and code manual with food codes and descriptions of foods.

PB82-138462 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Nationwide Food Consumption Survey, Puerto Rico, Individual, 1977-78.
Data file,
Brucy C. Gray, and Sharon L. Mickle. 1978, mag tape USDA/DF-81/018
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

This file contains food and nutrient intake data for 8366 men, women, and children (weighted on household basis, 8426 individuals unweighted) collected in urban areas of Puerto Rico in Summer and Fall of 1978 as part of the Nationwide Food Consumption Survey 1977-78. The interview was conducted in the home with each individual asked to recall his previous day's diet and then to keep a diet record for the next 2 days which the interviewer returned to review and pick up. Information was gathered on all days of the week including Saturday and Sunday. Data includes name for each eating occasion, time, and person(s) sharing it, and if eaten away from home, where eaten, type of service, and cost. For each food and beverage, the kind and quantity (grams) are given and whether from home supplies or obtained away. Data given on vitamin and mineral supplements taken, frequency of consuming organ meats during previous 30 days, whether person is a vegetarian and if so, type of foods eaten, whether person is on a diet, whether diet was typical, and self-appraisal of health status. Characteristics available for each individual are sex, age, race, if Spanish descent; estimated height and weight; pregnancy and lactation status for women; household income before taxes (category): household size; and education, occupation, and employment status of male and female heads. Nutrient content of each food, each day's intake, and 2 or 3 day average intakes are available for energy, protein, fat, carbohydrate, calcium, iron, magnesium, phosphorus, vitamin A value, thiamin, riboflavin, preformed niacin and vitamins B6, B12, and C.

PB82-138470 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Nationwide Food Consumption Survey, Household Low Income, 1979-80.
Data file,
Brucy C. Gray, and Mary Hama. Mar 80, mag tape USDA/DF-81/019
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

This file contains food and nutrient data of 3002 low income households from the USDA Nationwide Low-Income 2 Survey. This low-income survey was conducted from November 1979 through March 1980. The sample design provided for an area probability sample of low income households in the entire United States. When weights are applied, the total weighted sample gives 3009 interviews. The data were collected by personal interviews with household member most knowledgeable about the household food consumption. A food list was used to help recall kinds, quantities (converted to pounds) and costs of foods used from the household food supply during the 7 days prior to the interview. Counts of meals eaten at home and away from home were recorded for each household member, as well as for guests' meals and/or snacks served from household supply. Money value of all foods per household is summarized. For each food item reported, there are its conversion factor and nutritive value for food energy, protein, fat, carbohydrate, calcium, iron, magnesium, phosphorus, vitamin A value, thiamin, riboflavin, niacin, vitamin B6, vitamin B12, and ascorbic acid. Other information includes household sizes in equivalent nutrition units, nutritive values per nutrition unit, ratios of nutritive value per nutrition unit to the Recommended Dietary Allowances, and weekly aggregate nutritive values. Household income, education and employment of household heads, and other factors that might affect food consumption were reported. Accompanied are the data file format information and code manual with food codes and descriptions of foods.

PB82-138488 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Nationwide Food Consumption Survey, Individual Low Income, 1979-80.
Data file,
Brucy C. Gray, and Mary Hama. Mar 80, mag tape USDA/DF-81/020
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

This file contains food and nutrient intake for 9123 men, women, and children (weighted on household basis, 8492 individuals, unweighted) collected in the 48 conterminous states from November 1979 through March 31, 1980. The interview was conducted in the home with each individual asked to recall his previous day's diet. Information was gathered on all days of the week including Saturday and Sunday. Data include name for each eating occasion, time, and person(s) sharing it, and if eaten away from home, where eaten, type of service, and cost. For each food and beverage, the kind and quantity (grams) are given and whether from home supplies or obtained away. Data given on vitamin and mineral supplements taken, frequency of consuming organ meats during previous 30 days, whether person is a vegetarian and if so, type of foods eaten, whether person is on a diet, whether diet was typical, and self-appraisal of health status. Characteristics available for each individual are sex, age, race, if Spanish descent; estimated height and weight; pregnancy and lactation status for women; household income before taxes (category): household size; and education, occupation, and employment status of male and female heads. Nutrient content of each food and the day's intake, are available for energy, protein, fat, carbohydrate, calcium, iron, magnesium, phosphorus, vitamin A value, thiamin, riboflavin, preformed niacin and vitamins B6, B12, and C.

PB82-138496 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Nutritive Values of Foods Used in the Nationwide Food Consumption Survey (Including Puerto Rico), Basic Household, 1977-78.
Data file,
Brucy C. Gray, and Mary Hama. 1978, mag tape USDA/DF-81/021
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

This file contains nutritive values for 4,083 food items reported used by households in the USDA Nationwide Food Consumption Survey 1977-78 and the Household Food Consumption Survey in Puerto Rico. Food composition values are for 1 pound of food, as purchased for food energy (calories), protein (g), fat (g), carbohydrate (g), calcium (mg), iron (mg), magnesium (mg), phosphorus (mg), vitamin A (I.V.), thiamin (mg), riboflavin (mg), niacin (mg), vitamin B6 (mg), vitamin B12 (mcg), and ascorbic acid (mg) with cooking losses deducted for the following seven vitamins: vitamin A,

thiamin, riboflavin, niacin, vitamin B6, vitamin B12, and ascorbic acid. Also provided are conversion factors which convert appropriate food items to an equivalent weight based on calcium content or equivalents based on flour, sugar, fresh potatoes, eggs in shell, single strength juice, dry legumes, or shelled nuts. Most of the data on nutrients were derived from Table 2, U.S. Department of Agriculture Handbook No. 8 and its revised supplements. Some values from these sources were updated based on results of new food composition research, on information from industry about new food products, and in accordance with new regulations on the enrichment of food. A food code manual is provided with this data file which includes a unique 15-digit food code for each food item reported in the survey, a description of the food, and the commonly reported household measures with their weights in pounds for that food.

PB82-138504 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Nutritive Values of Foods Used in the Nationwide Food Consumption Survey Including Puerto Rico, Basic Individual, 1977-78.
Data file,
Brucy C. Gray, and Sharon Mickle. 1978, mag tape USDA/DF-81/022
Supersedes Rept. no. USDA/DF-80/006, PB80-197403.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

A nutrient data base of approximately 4545 food items developed for the USDA Nationwide Food Consumption Survey 1977-78. Only items reported in the survey are included. Foods reported exclusively in the Puerto Rican phase of the survey are included. Food composition values are for 100-gram edible portions of food as eaten, for energy (kilocalories), protein (g), fat (g), carbohydrate (g), calcium (mg), iron (mg), magnesium (mg), phosphorus (mg), vitamin A value (I.U.), thiamin (mg), riboflavin (mg), niacin (mg), vitamin B6 (mg), vitamin B12 (mcg), and vitamin C (mg). For milk and milk products, a calcium conversion factor is provided which converts each product to an equivalent weight of whole milk based on its calcium content relative to whole milk. Food items reported in the survey but not specifically described are assigned nutrient values for a commonly eaten form of the food for a composite of several forms. Food values for mixtures or recipes are based on popular recipes, commercial products, or composites of several products. A food code manual is provided which includes, for each item, a unique seven-digit food code, description of food, and commonly reported household measures with their weights in grams. The first digit of the code denotes one of nine major food categories. A tenth category of miscellaneous items used in small amounts, assigned a first digit of zero,

PB82-138512 CP **T99**
Science and Education Administration, Hyattsville, MD. Consumer Nutrition Center.
Nutritive Values of Foods as in Home and Garden Bulletin No. 72 Revised 1981, Release 2.
Data file,
Cecelia C. Wilkinson, and Betty Perloff. Apr 81, mag tape USDA/DF-81/023
Supersedes Rept. no. USDA/DF-81/006, PB81-146748.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

This file contains food composition data as published in table 2 of Home and Garden Bulletin No. 72, Nutritive Value of Foods revised in 1981. Values for food items are described in terms of household measures for the food and are provided for the weight of the household measure, percent water, food energy, protein, fat, saturated fatty acid, oleic acid, linoleic acid, carbohydrate, calcium, phosphorus, iron, potassium, vitamin A value, thiamin, riboflavin, niacin, and ascorbic acid. There are 730 food items included. A three-digit food code has been sequentially assigned to each food item after the items have been placed into food groups. A 24 character description of the food exist on each of the 87 character records.

PB82-139676 PC **A07**/MF **A01**
Statens Levnedsmiddelinstitut, Soeborg (Denmark).
List of Approved Food Additives (The Positive List) (Fortegnelse over Godkendte Tilsaetningsstoffer til Levnedsmidler (Positivlisten).
Oct 80, 134p ISBN-87-503-3711-4, ISBN-87-503-3399-2
Text in Danish, summary in English and Danish. Also pub. as ISSN-0107-0517.

According to Section three of the Food etc. Act (Act No. 310 of the 6th June, 1973) additives are substances which, without being foodstuffs as such or commonly used ingredients of mixed foodstuffs in themselves, are intended for addition to food to influence the nutritive value, keeping qualities, consistency, color, taste or smell or otherwise for technological or other purposes. This present list of approved additives has been drawn up pursuant to Section fourteen of the Food Act and to Order No. 316 of the 8th of June, 1973, concerning Food Additives and the Entry into Force of Certain Provisions of the Food etc. Act of the 6th June, 1973. The List is divided into Part A about the use of additives in the individual foodstuffs or groups of food, and Part B, in which the additives are listed in groups according to their function. Besides, an index is connected with the List in Parts C, D, and E.

PB82-141003 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
Regulation of Cancer-Causing Food Additives--Time for a Change.
Report to the Congress.
11 Dec 81, 92p HRD-82-3

The 1958 'Delaney Clause' of the Federal Food, Drug, and Cosmetic Act, which requires the Food and Drug Administration to ban the use of cancer-causing food additives, continues to be a source of controversy, an emotional issue, and a target for change. While food safety experts agree that the Delaney Clause should be changed because of its inflexibility, they disagree on the regulatory alternatives that should replace it. This report discusses the views of experts on this matter, the scientific tests used as a basis for decision-making, and the manner in which different agencies regulate cancer-causing substances. It also presents several alternative decisionmaking frameworks for the Congress to consider.

PB82-153438
(Order as PB82-153412, PC **A03**/MF **A01**)
National Marine Fisheries Service, La Jolla, CA. Southwest Fisheries Center.
Burnt Tuna: Conditions Leading to Rapid Deterioration in the Quality of Raw Tuna,
J. L. Cramer, R. M. Nakamura, A. E. Dizon, and W. N. Ikehara. Jun 81, 6p NOAA-81120301-2
Included in Marine Fisheries Review, v43 n6 p12-16 Jun 81.

Burnt tuna is raw which is paler and softer than normal. This study indicates that the burnt tuna condition results from muscle cell degeneration which begins prior to the death of the fish and proceeds more rapidly after death than in normal tuna. Female sex, longer fighting times, and less efficient chilling are positively correlated with the occurrence and severity of the burnt tuna condition.

PB82-153446
(Order as PB82-153412, PC **A03**/MF **A01**)
Maine Univ. at Orono.
Quality of Squid, 'Illex illecebrosus', Mantles Canned in Oil,
Bohdan M. Slabyj, Gordon E. Ramsdell, and Ruth H. True. Jun 81, 5p NOAA-81120301-3
Included in Marine Fisheries Review, v43 n6 p17-20 Jun 81.

Squid, Illex illecebrosus, mantles with skin removed were canned in oil, using quarter-pound aluminum sardine cans. The product had a good appearance, a mild flavor, and a firm texture; however, the mantles required blanching prior to canning. Ten minute blanching in 3 percent boiling brine resulted in about 45 percent shrinkage. Squid mantle strips canned in oil had an acceptable shelf life.

PB82-153453
(Order as PB82-153412, PC **A03**/MF **A01**)
California Univ., Davis. Dept. of Agricultural Engineering.
A System to Singulate and Align Squid for Packaging and Processing,
D. E. Brown, R. Paul Singh, and R. J. Coffelt. Jun 81, 7p NOAA-81120301-4
Included in Marine Fisheries Review, v43 n6 p21-26 Jun 81.

To reduce packaging time of whole California market squid, Loligo opalescens, and facilitate automatic feeding of a newly developed squid cleaning machine, a system to align and singulate squid has been developed. Data are presented relating system performance to processing rates for the squid cleaning machine and the packing industry.

PB82-803768 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Food Processing. July, 1976-August, 1980 (Citations from the NTIS Data Base).
Jan 82, 289p
Supersedes PB80-814718.

All types of food processing, but primarily food irradiation, fish protein processing, and freeze drying are subjects included in the selected abstracts. (This updated bibliography contains 282 citations, none of which are new entries to the previous edition.)

PB82-803776 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Food Processing. September, 1980-December, 1981 (Citations from the NTIS Data Base).
Jan 82, 113p
Supersedes PB80-814718, and NTIS/PS-79/0977.

All types of food processing, but primarily food irradiation, fish protein processing, and freeze drying are subjects included in the selected abstracts. (This updated bibliography contains 107 citations, all of which are new entries to the previous edition.)

PB82-861477 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Shelf Life of Foods. November, 1972-January, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Nov 72-Jan 82.
Jan 82, 302p
Supersedes PB80-807175.Prepared in cooperation with the International Food Information Service, Frankfurt, (Germany, F.R.).

This bibliography cites technical reports on food literature surveys of shelf stability of foods. Methods of extending food shelf life by means of chemical dips and treatments, various forms of radiation, vacuum packing, and different packaging methods and materials, are described. Most foods and drinks are mentioned. (This updated bibliography contains 297 citations, 97 of which are new entries to the previous edition.)

PB82-861543 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Microwave Food Processing Except Home Cooking. 1972-January, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Jan 82.
Jan 82, 220p
Supersedes PB80-806987.Prepared in cooperation with the International Food Information Service, Frankfurt (Germany, F.R.).

This bibliography cites technical reports on microwave processing of foods and beverages. Microwave home cooking is included in another bibliography. Among the subjects included in this bibliography are microwave drying, roasting, vacuum drying, freeze drying, killing of bacteria, thawing, blanching, dehydrating, sterilizing, and pasteurizing. Packaging, fast food processing, and marketing are also discussed. (This updated bibliography contains 239 citations, 36 of which are new entries to the previous edition.)

PB82-861550 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Food Bottling Lines and Plants. 1976-January, 1982 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1976-Jan 82.
Jan 82, 209p
Supersedes PB80-807019.Prepared in cooperation with the International Food Information Service, Frankfurt (Germany, F.R.).

Control and operation techniques of food bottling lines and design of food bottling equipment are considered in this bibliography. Beverage, liquid, and solid food bottling are discussed. Noise abatement, waste treatment, microbiological and mechanical hazards, environmental protection, and regulations are considered. (This updated bibliography contains 269 citations, 69 of which are new entries to the previous edition.)

SAND-80-0989C PC **A03**/MF **A01**
New Mexico State Univ., Las Cruces.
Dried, Irradiated Sewage Solids as Supplemental Feed for Cattle.
G. S. Smith, H. E. Kiesling, E. E. Ray, R. Orcasberro, and P. Trujillo. 1979, 37p CONF-7905103-2
Contract EY-76-C-04-0789
Energy technology conference on waste irradiation, Hanover, F.R. Germany, 2 May 1979.

Sewage solids were collected as primary settled solids and then dried and gamma-irradiated (using exp 60 Co or exp 137 Cs) to absorbed dosage of about one megarad to minimize viable parasites and pathogenic organisms. Nutrient composition and bioassays with rumen microbes suggested prospective usage as supplemental feed for ruminants. Short-term experiments with sheep and then with cattle further suggested that usage of nutrients could be beneficial and that accumulation of heavy metals was not excessive. A longer-term feeding trial with cattle fed sewage solids as 20% of diet for 68 days demonstrated that tissue uptake of elements such as Cu, Fe and Pb was measurably increased, but not sufficient to exceed ranges considered normal. Likewise, of 22 refractory organic compounds having toxicological interest, only a few were detectible in adipose tissue and none of these exceeded levels that have been reported in tissues from cattle produced conventionally. In a large-scale experiment, beef cows grazing poor-quality rangeland forage during late gestation-early lactation were given either no spplemental feed or cottonseed meal or experimental supplement comprised of 62% sewage solids. Supplements were provided for 13 weeks until rangeland forage quality improved seasonably. Supplemental cottonseed meal for cows improved weaning weights of calves by about 11% over unsupplemented controls; whereas, supplement with 62% sewage solids improved calf weaning weights by about 7%. Hazards or risks to animals or to human health appear to be slight when sewage solids of this type are fed as supplemental feeds to cattle in production programs of this type. (ERA citation 05:024331)

SAND-80-7035 PC **A07**/MF **A01**
Santa Barbara Research Center, Goleta, CA.
Status of Endangered and Threatened Plant Species on Tonopah Test Range: A Survey.
W. A. Rhoads, S. A. Cochrane, and M. P. Williams.
Oct 79, 126p
Contracts EY-76-C-04-0789, EY-76-C-08-1183

Six species under consideration by the US Fish and Wildlife Service (FWS) for endangered or threatened status were found on or near the Tonopah Test Range (TTR) in southern central Nevada. Based on recognized threats to these species, their overall distribution, rarity, and other factors, status recommendations were prepared for Sandia Corporation. In addition, ten species that occur in the vicinity of TTR, and which may yet be found on TTR, are discussed in brief. Each species is discussed in relation to distribution, rarity, taxonomy, habitat requirements, endangerment, assessment of status, and proposed protection and monitoring needs. Construction activities and off-road vehicle travel are the most prominent man-caused threats to species on TTR; habitat destruction by trampling and over-grazing by feral horses and non-permit cattle significantly modifies habitats of certain species. We recommend two kinds of protective measures. First is the planning of activities so that habitats, particularly the suggested protected habitats, are not disturbed. Second, and directed to the same end, off-road traffic should be curtailed in the regions of the proposed protected habitats. (ERA citation 05:012519)

6J. Industrial (Occupational) Medicine

AD-A108 366/6 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
The Acquisition and Use of Morbidity Data in Naval Environments,
William M. Pugh, and Donald D. Beck. 6 Aug 81, 8p
Rept no. NAVHLTHRSCHC-81-24

One component of the Navy occupational health information system being developed at the Naval Health Research Center is the medical monitoring subsystem. This component was designed to have the capacity to operate on a 'stand alone' basis. As an independent system medical data would be gathered stored, and retrieved to generate routine reports thus relieving medical personnel of some of their administrative burden. However, when operating as a component of the overall occupational health information system reports showing an individual's exposure to hazardous substance can be generated and periodic physical examinations of personnel working with hazardous materials can be automatically scheduled. Thus, a highly flexible system is being developed which can be shaped to meet needs that range from those of a dispensary at a Navy industrial facility to those encountered in the sick bay of a deployed ship. (Author)

PB82-100025 MF **A01**
Bureau of Labor Statistics, Washington, DC. Office of Occupational Safety and Health Statistics.
Occupational Injuries and Illnesses, New York, 1979.
Final rept.
1981, 1911p BLS/SDS/NY-79
See also report for 1978, PB81-115800.
Microfiche copies only.

This document contains 60 tabulations of characteristics of occupational injuries and illnesses related to industry, occupation, wage, and age of the injured or ill worker, related to indemnity compensation and extent of disability of the injury or illness. The data were compiled by the New York Workers' Compensation Board from records of workers' compensation cases closed during 1979 which involve death, eight or more lost workdays, or volunteer firefighters. The data include cases arising in private and public employments with these principal exceptions: local government employees in non-hazardous occupations, public school teachers in cities of over a million inhabitants, certain agricultural employees, household workers, and teaching and nonmanual employees of religious, charitable, or educational institutions and corporations, railroad and maritime workers, and other employees covered under Federal compensation laws.

PB82-142712 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH.
Analytical Services for Special Measurement Problems.
Final rept.
13 Nov 75, 10p
Contract PHS-CDC-88-74-102

Efforts in the area of analytical services to NIOSH for special measurement problems are summarized. Samples were difficult to analyze and outside the scope of typical analytical problems handled by NIOSH laboratories. Twenty-three benzene (71432) soluble extracts for filters containing coal-tar pitch volatiles were submitted. Each extract was quantitatively analyzed for acridine (260946), benzo (a)pyrene (50328), and betanaphthylamine (91598). Eight lacquer thinner samples were analyzed qualitatively for isopropyl-alcohol (67630), isopropyl acetate (108214), methylethylketone (78933), methylisobutylketone (108101), isobutyl alcohol (78831), isobutylacetate (110190), propylacetate (109604), butylacetate (123864), toluene (108883), xylenes/M, 0, P-isomers (1330207), benzene, and 3-methylhexone. Three pentachorophenol samples were analyzed for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) using gas chromatography via electron capture. A detergent sample was analyzed for monoethanolaminedodecyl benzene sulfonate, o-benzyl-p-chlorophenol, tetrasodium ethylenediaminetetra-acetate, isopropanol, benzene, toluene, and water. The analytical procedures for each element are listed.

PB82-142928 PC **A04**/MF **A01**
Professional Inst. of the American Management Associations, Hamilton, NY.
A Three and One Half Day Strategic Planning and Evaluation Workshop for the National Inst. for Occupational Safety and Health (NIOSH) Held at Hamilton, New York on February 26-March 1, 1973,
J. Goode, and J. Davis. Mar 73, 75p
Contract PHS-CDC-99-73-16

The report presents a workshop held by the American Management Association to provide a stimulus and framework for top management involvement in the development of and commitment to the NIOSH mission, goals, strategies and evaluation plan. Guidance was provided to assist the NIOSH group in addressing key planning and management issues, and in developing appropriate substantive material concerning them. This was achieved through the Team Planning Process approach. During the course of the workshop, the participants were provided with an orientation and exposure to the principles, theories, and practices of strategic planning.

PB82-143603 PC **A03**/MF **A01**
Utah Biomedical Test Lab., Salt Lake City.
Planning Report for an Epidemiological Study on Prevalence of Agricultural Respiratory Diseases,
F. J. Wenzel, R. C. Roberts, D. A. Emanuel, and J. J. Marx. 25 Jun 75, 39p TR-176-001
Contract PHS-CDC-99-74-011

The report covers the incidence and prevalence of agricultural respiratory disease, farmer's lung, type III allergy, extrinsic allergic alveolitis, in a population of farm workers. Topics include a statement of the problem, a summary of work done in the past, and a plan for the conduct of a study to determine prevalence of farmer's lung. Also included is a tentative budget and a proposal regarding the accomplishment of the planned work.

PB82-147547 PC **A02**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course: Course Director's Seminar.
Apr 75, 18p
Contract PHS-CDC-99-74-72
See also Lesson 1, PB82-147554.
Also available in set of 19 reports PC E99, PB82-147539.

An industrial hygiene chemistry course director's seminar is presented with details of the purpose and scope of the seminar, length of presentation, list of course director's duties, course objectives, overview of course content, use of course material, use of visual aids and self tests, use of personal touches, laboratory instruction and practice lecture instruction.

PB82-147554 PC **A02**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 1,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 19p
Contract PHS-CDC-99-74-72
See also PB82-147547, and Lesson 2, PB82-147562.
Also available in set of 19 Reports PC E99, PB82-147539.

An instructor Manual prepared to assist industrial hygienists and analytical chemist participating in the NIOSH Regional Training Program in the preparation and conduct of a one-week 'Industrial Hygiene Chemistry' course, is presented. Topics include course objectives: list of lessons, lectures, references, and readings; brief course outline; exercises and problems; self tests, copies of visuals; homework; laboratories; special preparation section; laboratory procedures; and figures and forms.

PB82-147562 PC **A03**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 2,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 50p
Contract PHS-CDC-99-74-72
See also Lesson 1, PB82-147554, and Lesson 3, PB82-147570.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 2 is devoted to concepts of Threshold Limit

Values, laboratory quality control, and laboratory accreditation.

PB82-147570 PC **A04**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 3,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 62p
Contract PHS-CDC-99-74-72
See also Lesson 2, PB82-147562, and Lesson 4, PB82-147588.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 3 encompasses the general use and application of types of direct reading instruments, including liquid reagents, detector tubes, chemiluminescence techniques, heat of combustion techniques, electrochemical techniques, thermal conductivity techniques, flame ionization techniques, gas chromatographic techniques, photometric techniques, and aerosol photometry.

PB82-147588 PC **A05**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 4,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 84p
Contract PHS-CDC-99-74-72
See also Lesson 3, PB82-147570, and Lesson 5, PB82-147596.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one-week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 4 encompasses general air flow calibration techniques, including calibration of sample volumes and calibration of sampling systems, and sampling procedures relevant to industrial hygiene chemistry, including standard mixtures and sample collection.

PB82-147596 PC **A03**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 5,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 33p
Contract PHS-CDC-99-74-72
See also Lesson 4, PB82-147588, and Lesson 6, PB82-147604.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 5 covers the operation and calibration of a fluoride ion selective electrode system for the purpose of quantitating the amount of fluoride collected in midget impingers. Sections are devoted to demonstration of a sampling train for fluoride and hydrogen fluoride in the air, synthesis of aqueous fluoride standards, preparation of reference samples for analysis, measurement of standards and samples, time response of the fluoride electrode, and statistical treatment and interpretation of data.

PB82-147604 PC **A04**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 6,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 65p
Contract PHS-CDC-99-74-72
See also Lesson 5, PB82-147596,and Lesson 7, PB82-147612.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 6 encompasses uses, conditions, and sampling constraints for visible light, ultraviolet, infrared and fluorescence spectrophotometry. Sections are devoted to molecular structure and energy levels, basic structure of the spectrophotometer, Beer's law, transmittance, and absorbance, visible light spectrophotometry, ultraviolet spectrophotometry, fluorescence spectrophotometry, infrared absorption spectrophotometry, sampling considerations and sample preparation.

PB82-147612 PC **A04**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 7,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 66p
Contract PHS-CDC-99-74-72
See also Lesson 6, PB82-147604, and Lesson 8, PB82-147620.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 7 encompasses applications, procedures, and equipment for visible light spectrophotometry, ultraviolet spectrophotometry, fluorescence spectrophotometry, and infrared spectrophotometry.

PB82-147620 PC **A03**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 8,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 32p
Contract PHS-CDC-99-74-72
See also Lesson 7, PB82-147612, and Lesson 9, PB82-147638.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 8 encompasses operation and calibration of a spectrophotometer, preparation of samples for analysis of the amount of free silica (quartz) in mineral samples, color development in standards and samples and absorbance readings, and calculations and data analysis.

PB82-147638 PC **A05**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 9,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 87p
Contract PHS-CDC-99-74-72
See also Lesson 8, PB82-147620, and Lesson 10, PB82-147646.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 9 encompasses an introduction to spectroscopy, including uses, conditions, sampling constraints and applications for x-ray diffraction, x-ray fluorescence, optical emission, and flame emission analysis. Details are also given on origins of atomic spectra and spectral dispersion and resolution.

PB82-147646 PC **A04**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 10,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 66p
Contract PHS-CDC-99-74-72
See also Lesson 9, PB82-147638, and Lesson 11, PB82-147653.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 10 encompasses uses, conditions, sampling constraints, instrumentation and applications for atomic absorption spectrometry. Sections are devoted to various aspects of atomic absorption spectrometry, including: light sources, wavelength selection and measurement, the flame as the atomic vapor cell, resistively heated atomic vapor cells, samples and standards preparation, and applications in occupational health.

PB82-147653 PC **A03**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 11,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 27p
Contract PHS-CDC-99-74-72
See also Lesson 10, PB82-147646, and Lesson 12, PB82-147661.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 11 encompasses operation and calibration of an atomic absorption spectrophotometer for the purpose of quantitating the amounts of metals (lead) collected on filters such as cellulose membranes. Details are given on preparation of aqueous calibration standards, preparation of samples for analysis, optimization of atomic absorption spectrophotometer operating parameters for lead, and calculation and interpretation of results.

PB82-147661 PC **A04**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 12,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 59p
Contract PHS-CDC-99-74-72
See also Lesson 11, PB82-147653, and Lesson 13, PB82-147679.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course designed to give program graduates expertise in environmental sampling and analysis. Lesson 12 is titled an introduction to chromatography, including variety, conditions, and sampling constraints for chromatography. Sections are devoted to partition chromatography theory, column parameters in gas chromatography and liquid chromatography, and sample preparation for chromatography.

PB82-147679 PC **A05**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 13,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 92p
Contract PHS-CDC-99-74-72
See also Lesson 12, PB82-147661, and Lesson 14, PB82-147687.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course designed to give program graduates expertise in environmental sampling and analysis. Lesson 13 encompasses the application, techniques, procedures, and equipment for chromatographic separation and analysis. Specific sections give details on gas chromatography coupled to spectroscopic instruments, planar chromatography applications and instrumentation, and column chromatography applications and instrumentation.

PB82-147687 PC **A03**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 14,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 38p
Contract PHS-CDC-99-74-72
See also Lesson 13, PB82-147679, and Lesson 15, PB82-147695.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course designed to give program graduates expertise in environmental sampling and analysis. Lesson 14, entitled gas chromatography of organic solvents, encompasses operation and calibration of a gas chromatograph to quantitate benzene, chloroform, carbon tetrachloride and trichloroethylene. Sections include preparation of samples for desorption efficiency, preparation of standards, analysis of standards and samples, and calculations and data analysis.

PB82-147695 PC **A03**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 15,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 27p
Contract PHS-CDC-99-74-72
See also Lesson 14, PB82-147687, and Lesson 16, PB82-147703.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 15, entitled titrametric determination of sulfur dioxide, encompasses demonstration of a gas dilution system for standard concentrations of sulfur dioxide using a permeation tube, demonstration of a sampling train with midget impinger, standardization of titrant, and calculations and data analysis.

PB82-147703 PC **A02**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 16,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 23p
Contract PHS-CDC-99-74-72
See also Lesson 15, PB82-147695, and Lesson 17, PB82-147711.
Also available in set of 19 reports, PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 16, colorimetric determination of sulfur dioxide, encompasses preparation of calibration solutions, spectrophotometric measurement, and calculations and data analysis.

PB82-147711 PC **A03**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 17,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 45p
Contract PHS-CDC-99-74-72
See also Lesson 16, PB82-147703, and Lesson 18, PB82-147729.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 17, biological monitoring, encompasses the purposes, uses, and techniques associated with urine, blood, and breath analysis as they apply to biological monitoring.

PB82-147729 PC **A04**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
Industrial Hygiene Chemistry Course. Instructor Manual: Lesson Number 18,
R. D. Pepler, P. A. Brainin, and E. A. King. Apr 75, 68p
Contract PHS-CDC-99-74-72
See also Lesson 17, PB82-147711.
Also available in set of 19 reports PC E99, PB82-147539.

Instructor manual for a one week 'Industrial Hygiene Chemistry' course, designed to give program graduates expertise in environmental sampling and analysis. Lesson 18 encompasses principles, equipment, and applications for anodic stripping voltametry, sample concentration methods, and micro analysis.

SCPRI-RM-1-1979 PC **A03**/MF **A01**
Service Central de Protection contre les Rayonnements Ionisants, Le Vesinet (France).
Progress Report. Monthly Measurement Tables.
Jan 79, 34p
In French.
U.S. Sales Only.

Among the many topics considered were the evaluation and control of occupational radiation exposures at commercial nuclear power plants. Areas relative to exposure evaluation that have been identified as needing attention at the present time include improved techniques for monitoring occupational neutron exposures, better data collection and analysis with respect to internally deposited radionuclides, and an up-grading in quality control procedures in the manufacture of radiation monitoring instruments. Areas relative to exposure control that have been identified as needing attention include the development of additional design and manufacturing approaches for preventing the production and buildup of key radionuclides within reactor cooling systems; the development and testing of techniques for removing those radionuclides which do accumulate in the system; the application of risk/benefit assessments to procedures for the maintenance, repair, modification, replacement, and disposal of major nuclear power plant components, such as steam generators. Measurement tables concerning the surveillance of the environment are presented. (see also the SCPRI-RT--1-1979 report). (Atomindex citation 11:508379)

SCPRI-RM-2-1979 PC **A03**/MF **A01**
Service Central de Protection contre les Rayonnements Ionisants, Le Vesinet (France).
Progress Report. Monthly Measurement Tables.
Feb 79, 28p
In French.
U.S. Sales Only.

Among the many topics considered were the evaluation and control of occupational radiation exposures at commercial nuclear power plants. Areas relative to exposure evaluaion that have been identified as needing attention at the present time include improved techniques for monitoring occupational neutron exposures, better data collection and analysis with respect to internally deposited radionuclides, and an up-grading in quality control procedures in the manufacture of radiation monitoring instruments. Areas relative to exposure control that have been identified as needing attention include the development of additional design and manufacturing approaches for preventing the production and buildup of key radionuclides within reactor cooling systems; the development and testing of techniques for removing those radionuclides which do accumulate in the system; the application of risk/benefit assessments to procedures for the maintenance, repair, modification, replacement, and disposal of major nuclear power plant components, such as steam generators. Measurement tables concerning the surveillance of the environment are presented. (see also the SCPRI-RT--1-1979 report). (Atomindex citation 11:508380)

6K. Life Support

PAT-APPL-6-315 278 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Method and Apparatus for Detecting Coliform Organisms.
Patent Application,
K. Nishioka, D. Nibley, E. Jeffers, and R. Brooks.
Filed 26 Oct 81, 25p N82-12739/0, NASA-CASE-ARC-11322-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A sample containing coliform bacteria is cultured in a liquid growth medium. The cultured bacteria produce hydrogen which is vented to a second call containing a buffer solution in which the hydrogen dissolves. By measuring the potential change in the buffer solution caused by the hydrogen, as a function of time, the initial concentration of bacteria in the sample is determined. Alternatively, the potential change in the buffer solution can be compared with the potential change in the liquid growth medium to verify that the potential change in the liquid growth medium is produced primarily by the hydrogen gas produced by the coliform bacteria.

6L. Medical and Hospital Equipment

PB82-137043 PC **A18**/MF **A01**
Veterans Administration, Washington, DC.
Handbook of Hearing Aid Measurement, 1976.
Information bulletin.
1976, 415p VA/IB-11-52
See also report for 1979, PB82-117219.

The Veterans Administration (VA) program for measuring and evaluating performance characteristics of hearing aids was developed in order to select a manageable group of instruments from the models available on the consumer market. A total of 145 models were selected from 24 manufacturers. Aids are tested for VA by the Sound Section of the Institute of Basic Standards at the National Bureau of Standards, and the Biocommunications Laboratory, University of Maryland. Raw test data is evaluated and converted into a performance score or 'Index of Characteristics'. Manufacturers, their models, types of aids, power categories, index of characteristics score and the models selected are listed. Performance data is included from Bureau of Standards and from University of Maryland tests. Special test data on hearing aids selected for contract year 1976 is included.

PB82-137050 PC **A19**/MF **A01**
Veterans Administration, Washington, DC. Dept. of Medicine and Surgery.
Hearing Aid Performance Measurement Data and Hearing Aid Selection Procedures, Contract Year 1974.
1974, 428p VA/IB11-45

The Veterans Administration program for measuring and evaluating performance characteristics of hearing aids was developed in order to select a manageable group of instruments from among the models available on the consumer market. A total of 114 models were received from 19 manufacturers from which instruments were selected to be issued to veterans in the 1974 contract year. Aids were subjected to performance measurements by the National Bureau of Standards, and the results were transmitted to the Veterans Administration Auditory Research Laboratory for statistical and comparative analysis. A copy of the bid solicitation for contract year 1974 is included. A chart lists manufacturers, their models, types of aids, power categories, performance scores and the models selected for the contract year 1974. A list shows average gain, average maximum power output, and performance score for each model measured. Performance measurement data on each of three sample instruments for each model submitted is included.

PB82-141631 PC **A11**/MF **A01**
Veterans Administration, Washington, DC.
Handbook of Hearing Aid Measurement, 1978.
Information bulletin.
1978, 226p VA/IB-11-66
Prepared in cooperation with National Bureau of Standards, Washington, DC, and Maryland Univ., College Park. Dept. of Hearing and Speech Sciences.

The Veterans Administration's (VA) program for measuring and evaluating the performance characteristics of hearing aids was developed as a means of selecting high quality instruments at a reasonable cost from the wide variety of models available. For the 1978 contract year, 23 manufacturers submitted a total of 85 hearing aid models. Regular hearing aid models were evaluated this year, and the 1977 special feature aids selected were retained for 1978. Aids were tested by the Sound Section of the Institute at the National Bureau of Standards and the Biocommunications Laboratory at the University of Maryland. A summary of hearing aid manufacturers and the models tested is given, along with the index of characteristics scores. Performance measurement data from National Bureau of Standards as well as the data for hearing aids selected for the contract year 1978-79 are given.

PB82-141649 PC **A14**/MF **A01**
Veterans Administration, Washington, DC.
Handbook of Hearing Aid Measurement, 1977.
Information bulletin.
1977, 305p VA-IB-11-60

The Veterans Administration (VA) program for measuring and evaluating the performance characteristics of hearing aids was developed as a means of selecting a manageable group of instruments from the models available on the consumer market. For the 1977 contract year, 23 manufacturers submitted 105 models for consideration. Special purpose hearing aids (compression, directional, hi-pass, CROS, and BICROS) and regular hearing aids will be evaluated in alternate years, beginning with 1977's test of special purpose hearing aids. Performance measurement data from the

National Bureau of Standards is given, and a list of manufacturers, model, type, category, statistics and index of characteristics score is also included.

PB82-147323 PC **A03**/MF **A01**
Food and Drug Administration, Silver Spring, MD. Bureau of Medical Devices.
Measurement of Leachables from Tampons.
Final rept.,
Nelson Lao. 29 Jun 81, 42p FDA/BMD-82/14

A water and n-heptane extraction of several brands of highly absorbent tampons have been examined by various analytical methods. Many inorganic elements such as sodium, silicon, boron, magnnsium, iron, aluminum and titanium have been found in trace amounts in all the tested brands. The common organic substance in most of the tampons brands are traces of wax and surfactant-like compounds. The residue of Rely tampons has a quantity of mineral oil which is not present in other brands. O.B. tampons have the least amount of both organic and inorganic residues. Playtex Deodorant tampons have the largest weight of inorganic residue and some very complex organic components. Some organic acid, alcohols, amines and hydrocarbons were found, but many organic components of the extracts still remain to be identified.

PB82-147331 PC **A02**/MF **A01**
Food and Drug Administration, Silver Spring, MD. Bureau of Medical Devices.
Measurement of Tampon Absorbency; Evaluation of Tampon Brands.
Final rept.,
D. E. Marlowe. 29 Jun 81, 17p FDA/BMD-82/15, 81-107

In an earlier report, a protocol for the measurement of tampon absorbency was evaluated. The Syngyna Test, slightly modified for this study, was used to measure the tampon absorbency of all brands of tampons which are currently marketed. This report presents the net weight of the absorbed fluid and the Absorption Efficiency of each brand.

PB82-147349 PC **A02**/MF **A01**
Food and Drug Administration, Silver Spring, MD. Bureau of Medical Devices.
Measurement of Tampon Absorbency; Test Method Evaluation.
Final rept.,
D. E. Marlowe, R. M. Weigle, and R. S. Stauffenberg. May 81, 20p FDA/BMD-82/16, 81-013

The 'Syngyna' test, developed by the tampon industry to measure tampon absorbency has been evaluated in the FDA Center for Medical Device Analysis. In addition, two other tests were evaluated which were slight modifications of the 'Syngyna' test but which the authors felt more closely represented the environment in which tampons might be used. Comparisons of the three tests were made on six brands of highly absorbant tampons. The evaluation showed no particular difficulties in application of the test procedures. However, the angle at which the test chamber is suspended and the rate of fluid infusion were shown to affect tampon absorbency. A ranking of the tampons tested by relative absorbency is provided.

PB82-148057 PC **A03**/MF **A01**
Sigri Elektrographit G.m.b.H., Meitingen (Germany, F.R.).
Carbon Fiber Reinforced Carbon Prostheses for Joint and Bone Replacement,
Horst Boeder, and Guido Gistinger. Dec 80, 42p BMFT-FB-T-156
Trans. of mono. Der Prothetische Gelenk- und Knochenersatz durch Kolenstoffaserverstaerkten Kohlenstoff, n.p., n.d.

Carbon fiber reinforced carbon offers a solution to the problem of obtaining a permanent fixation of joint endoprostheses in the living bone, on account of its biocompatibility and strength. Above all, the loosening problem has to be solved which, combined with fatigue, limits the life of metal hip joint prostheses to between 10 and 15 years. The main aim of this development program was to realize prostheses models which guarantee a fixation of the stem in the femur according to the physiological requirements and also employ the fiber composite in an optimized form. Primary stability of the implantation was regarded as the most important design criterium. For all prostheses models, all Al2O3 or Al2O3 with HOPE were chosen for the ball-cup respectively, as they are proven materials. Two fixation methods were investigated during the period of the report. Both prostheses models exhibit static strengths that promise high dependability in situ. Dynamic tests upon the long stem prosthesis confirmed this expectation.

6M. Microbiology:

AD-A108 196/7 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Microbiology.
The Physiological Bases for Microbial Barotolerance.
Final rept.,
Robert E. Marquis. 13 Nov 81, 18p
Contract N00014-75-C-0634

Growth inhibition by narcotic gases is not a narcotic response but belongs to a new and different class of responses. The range of potencies of various types of anesthetic agents for microbial growth inhibition is not interpretable in terms of simple physio-chemical parameters such as lipid solubility. The growth inhibitory actions of anesthetic gases apply to both prokaryotic and eukaryotic cells, including mammalian tissue-culture cells. The ecological importance of hydrostatic pressure in the marine environment is much more extensive than previously considered - pressure can be a major ecological factor even in shallow water when otherwise nonoptimal growth conditions render organisms hypersensitive to pressure. Growth of microorganisms can be optimized with respect to pressure in the general way that one optimizes growth with respect to temperature and pH - 1 atm is not the optimal growth pressure for most bacteria when all environmental parameters are adjusted to give maximal growth. Pressure-induced germination of bacterial endospores is very much affected by the specific

AD-A108 308/8 PC **A02**/MF **A01**
Army Medical Research Unit, Kuala Lumpur (Malaysia).
Serological Classification of Rickettsia tsutsugamushi Organisms Found in Chiggers (Acarina: Trombiculidae) Collected in Peninsular Malaysia,
A. Shirai, A. L. Dohany, S. Ram, G. L. Chiang, and D. L. Huxsoll. 30 Nov 80, 5p
Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v75 n4 p580-582 1981.

No abstract available.

6N. Personnel Selection and Maintenance (Medical)

AD-A108 599/2 PC **A03**/MF **A01**
Texas Univ. at Austin. Dept. of Mathematics.
Statistical Tools for Determining Fitness to Fly.
Final rept. Sep 78-Mar 80,
Patrick L. Brockett, and Gerald A. Shea. Sep 81, 44p SAM-TR-81-20
Contract F33615-78-C-0623

The goal of this project is to use data from regularly scheduled physical examinations to estimate the probability of an event such as a heart attack. This is done via the construction of a mathematical model. A high probability of an event as computed by the model would be evidence of a high risk case. The model developed here, termed the periodic checkup predictive model, is a survival distribution model similar to the proportional hazards model when there is little or no loss to followup and to logistic regression when the object is to predict the occurrence of an event during a fixed interval of time. (Author)

6O. Pharmacology

AD-A108 179/3 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
New Tissue Schizontocidal Antimalarial Drugs,
David E. Davidson, Jr., Arba L. Ager, John L. Brown, Frank E. Chapple, and Richard E. Whitmire. 1981, 19p
Pub. in Bulletin of the World Health Organization, v59 n3 p463-479 1981.

No abstract available.

AD-A108 295/7 PC **A03**/MF **A01**
Louisville Univ., KY. School of Medicine.
Assessment of Antiradiation Drug Effectiveness to Fission Neutron Irradiation.
Annual rept. no. 1. Apr-Aug 81,
Curtis P. Sigdestad. 1 Sep 81, 42p
Contract DAMD17-81-C-1070

This report deals with the assays of various compounds for their toxicity of anti-radiation efficacy following exposure to either Co-60 or fission neutron irradiation. The compounds reported herein include WR 347, WR 2721, WR 3689, WR 44923, WR 109342, WR 151327, WR 16843, and WR 176542. The end-points measured in the radiation studies were LD50(6) and LD50(30). The compounds and their dose modification factors (DMF) for the neutron LD50(6) following i.p. administration, were, in descending order of effectiveness: WR 151327 (1.42), WR 347 (1.37), WR 3689 (1.34) WR 44923 (1.34), WR 2721 (1.26), WR 168643 (1.24), and WR 176542 (1.23). The corresponding LD50(30)'s for fission neutron irradiation following i.p. administration, were: WR 168643 (1.67), WR 3689 (1.52), WR 151327 (1.45), WR 44923 (1.39), WR 347 (1.22), WR 2721 (1.21), and WR 176542 (1.18). For low LET Co-60 gamma irradiation the LD50(6) and LD50(30) were determined for WR 347 following i.p. administration. The DMF's obtained were: LD50(6) (1.4), LD50(30) (1.5). (Author)

AD-A108 296/5 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Effects of Anti-Convulsant Medication on Sleep Patterns.
Interim rept.,
Laverne C. Johnson. Aug 81, 15p Rept no. NAVHLTHRSCH-81-26
Presented at the International Symposium on Sleep and Epilepsy, Montpellier, France, 608 Jul 81.

A review of the published literature on effects of anticonvulsant medication on sleep patterns revealed few studies. The paucity of studies is probably due to the fact that all-night EEG-recorded sleep studies are not part of the usual diagnostic procedures for seizure patients. Seizure patients are seldom referred to the sleep laboratories and clinics, where the all-night sleep recording is routine. Also, few patients are treated by a single convulsant. Most studies have used barbiturates, and the effects of this class of drug on sleep stages appear to be the same whether the barbiturate is prescribed as an anti-convulsant or sedative-hypnotic. The same sleep stage changes are also found for the benzodiazepines used as a sedative-hypnotic and as an anti-convulsant. Acute studies indicate that anticonvulsants decrease REM sleep, while chronic ingestion decreases SWS, but total amount of NREM sleep is less affected. Sleep spindles usually are increased. An epileptic patient's sleep pattern is most likely to be more normal or stabilized after effective treatment. This normalization appears to be due to the control of nocturnal seizures, which previously disrupted sleep, rather than due to any effect of the anti-convulsant per se on sleep patterns. (Author)

AD-A108 297/3 PC **A03**/MF **A01**
Naval Health Research Center, San Diego, CA.
Sedative-Hypnotics and Human Performance.
Interim rept.,
Laverne C. Johnson, and Doris A. Chernik. Jun 81, 27p Rept no. NAVHLTHRSCHC-81-19

This paper reviews the published papers that involved presleep ingestion of hypnotics and administration of performance tasks the next day. To be included, studies had to have employed statistical analysis of drug vs. placebo performance and used as marketed hypnotic. Fifty-two studies met all criteria. The study subjects were primarily young noninsomniac males. Insomniacs were studied in only 8 studies. Eleven benzodiazepines, 7 barbiturates, and 7 'other' hypnotics were administered in one or more studies.

AD-A108 311/2 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.

A Role for Endorphins in the Pathophysiology of Spinal Cord Injury.
Alan I. Faden, and John W. Holaday. 1981, 14p
Pub. in Neurosecretion and Brain Peptides, p435-446 1981.

No abstract available.

AD-A108 434/2 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Human Resources Div.
FDA Should Reduce Expensive Antibiotic Testing and Charge Fees Which More Closely Reflect Cost of Certification.
28 Oct 81, 38p Rept no. GAO/HRD-82-11
Report to the Secretary of Health and Human Services.

The Food and Drug Administration (FDA) certifies batches of antibiotics, insulin, and color additives. Certification is the testing of batch samples for compliance with established standards and the issuing of certificates for batches that pass the tests. FDA charges fees to manufacturers to cover its cost of certification. The current level of antibiotic testing is not necessary. The number of batches failing certification tests has historically been low. Batch certification is an expensive product assurance strategy and other less costly control mechanisms are available. Further, GAO believes FDA should revise the method for determining the fees charged manufacturers for the cost of certification. GAO makes several recommendations to the Secretary of the Department of Health and Human Services to resolve these matters. (Author)

PAT-APPL-6-180 373 PC **A02**/MF **A01**
Department of Health and Human Services, Washington, DC.
Nitroimidazoles of Low Toxicity and High Activity as Radiosensitizers of Hypoxic Tumor Cells.
Patent Application,
W. W. Lee. Filed 2 Aug 80, 12p PB82-148503
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention is based in part on the discovery that the compounds enumerated below are relatively low in toxicity while at the same time having a high degree of effectiveness as radiosensitizers of hypoxic cells in tumors to enhance the effectiveness of radiation therapy applied to the tumor: NSC 301467 N-(2-Hydroxyethyl)-2-(2-nitro-1-imidazolyl)acetamide and NSC 314055 N,N-Di-(2-hydroxyethyl)-2-(2-nitro-1-imidazolyl)acetamide.

PAT-APPL-6-308 350 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Antimicrobial Glycolic Acid Derivatives.
Patent Application,
August V. Bailey. Filed 5 Oct 81, 9p PB82-148560
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Esters and mixed ester-amides derived from glycolic acid by substitution at the hydroxyl and carboxyl functions were prepared by conventional procedures and tested for antimicrobial activity. All of the compounds tested showed some inhibition against four microorganisms under the test conditions, and some of them had potent activity. These new compounds have properties which make it possible for them to be used as biostatic agents in commercial products.

PAT-APPL-6-308 743 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Antimicrobial Glycolic Acid Derivatives.
Patent Application,
August V. Bailey. Filed 5 Oct 81, 9p PB82-148545
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Esters and mixed ester-amides derived from glycolic acid by substitution at the hydroxyl and carboxyl functions were prepared by conventional procedures and tested for antimicrobial activity. All of the compounds tested showed some inhibition against four microorganisms under the test conditions, and some of them had potent activity. These new compounds have properties which make it possible for them to be used as biostatic agents in commercial products.

PB82-140757 PC **A99**/MF **A01**
Stanford Univ., CA. Dept. of Medicine.
Development, Implementation, and Evaluation of the Monitoring and Evaluation of Drug Interactions by a Pharmacy Oriented Reporting System (Mediphor).
Executive summary (Final) 1 Nov 71-15 Mar 79,
Stanley N. Cohen, Ann Barry Flood, David U. Himmelberger, Richard J. Mangini, and Terrence N. Moore. 31 Jul 81, 822p NCHSR-81-240
Grant PHS-HS-00739

This report describes the development, implementation, and evaluation of the MEDIPHOR computer-based system. The MEDIPHOR (Monitoring and Evaluation of Drug Interactions by a Pharmacy Oriented Reporting) system is used by pharmacists for alerting physicians about potential drug reactions. The report provides a detailed description of this system (including a computer user's manual) and the current system configuration at the Stanford University Medical Center. Descriptions of the earlier system protypes and preliminary evaluation studies are included. Finally, the evaluation of MEDIPHOR at two community hospitals in Indiana is presented. This section includes the design used for the study, data sources, questionnaires, results, and a discussion of operational problems in interpreting the results and evaluating a system like MEDIPHOR. The results of the evaluation studies indicate that overall approximately one of every six patients was prescribed one or more potentially interacting drug combinations prior to using MEDIPHOR. The initial evaluation of MEDIPHOR at Stanford University Hospital showed statistically significant effects on both the actions of physicians and the consequences of these actions, whereas the study at the two community hospitals in Indiana showed effects on actions only.

PB82-142563 PC **A07**/MF **A01**
Veterans Administration, Washington, DC. Reports and Statistics Service.
Psychiatric Drug Study. Part II. Mental Hygiene Clinic Survey, Day Treatment Center Survey, Day Hospital Survey,
Susan Gee. Sep 80, 134p CONTROLLER MONO-12, VA/80-5061
See also Part 1, PB80-222375.

This is the second in a series of three reports on the 1978 Psychiatric Drug Survey. The purpose of this report is to describe the usage of psychiatric drugs in three Veterans Administration (VA) outpatient treatment settings: mental hygiene clinics, day treatment centers and day hospitals. No attempt is made to evaluate the ordering practices or the effectiveness of treatment. Correlation between diagnoses and drug orders is made, and the types of drug, including antipsychotic, anxiolytic, antidepressant, antiparkinson, and sedative-hypnotic drugs, are statistically described as they are distributed. Incidence of tardive dyskinesia and the types of drugs causing the syndrom are described.

PB82-146168 PC **A06**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for Policy Alternatives.
Relationships Between Aspects of Pharmaceutical Regulation, Innovation, and Therapeutic Benefits.
Final rept. on Phase 1,
Dale Hattis, Rick Andrews, J. Worth Estes, and Sally T. Owen. Mar 80, 116p CPA/WP-80-3, NSF/PRA-7722330
Grant NSF-PRA77-22330

The first phase of a research project concerning the impact of regulation on pharmaceutical innovation is described. The project is based on comparisons of regulatory policies, innovation processes, and innovative output and drug benefits for different types of pharmaceuticals. A theoretical framework is presented which includes basic theories of scientific advance and industrial innovation, and a theory of the natural history of drug innovation within therapeutic classes. Useful and potentially useful variables for hypothesis building are defined in relation to aspects of innovation processes, regulatory and non-regulatory stimuli, innovative output, and therapeutic benefits. Preliminary observations are made of relationships between these variables. Also presented are preliminary inferences from work done to date and generic types of information on drug innovation/regulation relationships likely to be helpful to the Food and Drug Administration, industry, and Congress. Tentative hypotheses for future work are included.

PB82-146473
(Order as PB82-146457, PC **A17**/MF **A01**)
National Inst. of Arthritis, Diabetes, and Digestive and Kidney Diseases, Bethesda, MD.
Microbial Iron Transport Compounds (Siderophores) as Chelating Agents.
1981, 19p
Included in Symposium (2nd) on the Development of Iron Chelators for Clinical Use, p25-44 1981.

No abstract available.

PB82-860909 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Non-Enteric Bacteria: Antibiotic Sensitivity Testing. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for 1978-Jan 82.
Jan 82, 171p

This bibliography contains citations concerning the comparison of in-vitro antibiotic sensitivity testing of non-enteric bacteria. Disk diffusion and microdilution methods, quality control and the interpretation of results are discussed. Bacterial isolates from humans and animals are considered. (Contains 138 citations fully indexed and includes a title list.)

PB82-860917 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Enterobacteriaceae: Antibiotic Sensitivity Testing. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for 1978-Jan 82.
Jan 82, 168p

This bibliography contains citations concerning the comparison of in-vitro antibiotic activity of bacterial isolates determined by disk diffusion and microdilution methods. Quality control of the manual and automated systems is considered, and errors encountered in the interpretation of results are discussed. Bacterial isolates from human and animal sources are considered. (Contains 137 citations fully indexed and includes a title list.)

PB82-861436 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Acetoaminophen: Metabolism and Toxicity. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for 1978-Jan 82.
Jan 82, 131p

This bibliography contains citations concerning the metabolism and toxicity of acetoaminophen (paracetamol). The metabolism of acetoaminophen by the liver and intestine is discussed, and the clinical use and side effects are considered. The synergistic effects of alcohol and other drugs on heptotoxicity are detailed. Methods of analysis are also discussed. (Contains 131 citations fully indexed and includes a title list.)

6P. Physiology

AD-A108 321/1 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Abnormal Brainstem Auditory Evoked Potentials and Neuropathology in 'Locked-in' Syndrome.
Final rept.,
D. M. Seales, R. D. Torkelson, R. M. Shuman, V. S. Rossiter, and J. D. Spencer. 1 Oct 80, 7p Rept no. NAVHLTHRSCHC-80-8
Pub. in Neurology (Ny) v31 n7 p893-896 Jul 81.

No abstract available.

AD-A108 445/8 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Visual Training Effects on Normal Vision,
Richard A. Goodson, and Alton J. Rahe. 8 Jul 80, 6p Rept no. SAM-TR-80-311
Pub. in American Jnl. of Optometry and Physiological Optics, v58 n10 p787-791, Oct 81. Presented at the Annual Meeting of the American Academy of Optometry in Boston, MA, 1978.

No abstract available.

6Q. Protective Equipment

AD-A108 575/2 PC **A05**/MF **A01**
Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD.
The Effect of Chemical Protective Clothing and Equipment on Combat Efficiency.
Technical rept. Apr 80-Jul 81,
John A. Rakaczky. Nov 81, 85p Rept no. AMSAA-TR-313

A need for specific, quantitative data pertaining to the degradation of individual and unit combat efficiency caused by the wearing of chemical warfare (CW) protective gear, i.e., mask, hood, gloves, overgarment, and overboots. The US Army Materiel Systems Analysis Activity (USAMSAA) has initiated a program designed to provide these data. This report describes the first portion of this program, the development of a viable data base which will enable meaningful and useful degradation data to be generated through employment of computer simulations. Computer simulations are used to evaluate doctrine, training procedures, equipment and occasionally to study current battlefield scenarios. In any future conflict there is the strong possibility that toxic chemical agents will be employed by opposing forces to achieve a tactical advantage. As a result, computer models are being modified or developed to study the effects that chemical warfare will have on military operations.

6R. Radiobiology

PB82-803651 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Radiation Effects on Cells and Chromosomes. September, 1979-November, 1981 (Citations from the NTIS Data Base).
Jan 82, 200p
Supersedes PB80-813884, and NTIS/PS-79/0893. See also 1964-Aug, 1979, PB80-813876.

Research reports are cited on radiation effects on cell physiology, chemistry, and genetics. Included are discussions on molecular mechanisms of mutagenesis, carcinogenesis, and radiotherapy. (This updated bibliography contains 193 citations, 122 of which are new entries to the previous edition.)

RERF-TR-16-77 PC **A02**/MF **A01**
Radiation Effects Research Foundation, Nagasaki (Japan). Nagasaki Branch.
Bone Marrow Cytology in Hiroshima Atomic Bomb Survivors 5 Years Following Exposure.
S. N. Oesterle, and S. C. Finch. Nov 78, 25p
Contract EX-76-C-28-3161
In Japanese and English.

Bone marrow aspiration smears obtained from 35 individuals, 5 years following expsoure to the Hiroshima atomic bomb, were intensively evaluated for radiation related cytologic abnormalities. No definite radiaton related changes were observed, but some findings were very suggestive. The most interesting of these was the occurrence of internuclear bridges joining erythroid precursors in the marrow smears of seven (20%) of the heavily exposed survivors. Although not specific it is likely that this lesion is indicative of residual stem cell damage and some degree of ineffectual erythropoiesis. The bone marrow morphologic lesions may be good markers of residual radiation damage but they are too infrequent in their occurrence to be of value as a biologic dosimeter. The findings in this study also suggest that a gradual disappearance of radiation induced late bone marrow changes continues for periods of 3 to 5 years or more following high dose acute radiation exposure. (ERA citation 04:052214)

SGAE-2962 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Effect of Low Radiation Doses on DNA Repair Processes.
H. Tuschl. Aug 78, 11p BL-234/78
In German.
U.S. Sales Only.

Error free DNA repair processes are an important prerequisite for the maintenance of genetic integrity of cells. They are of special importance for persons therapeutically or occupationally exposed to radiation. Therefore the effect of radiation therapy and elevated natural background radiation on unscheduled DNA synthesis was tested in peripheral lymphocytes of exposed persons. Both, autoradiographic studies of unscheduled DNA synthesis and measurement of exp 3 H-thymidine uptake into double stranded and single-strand containing DNA fractions revealed an increase of capacity for DNA repair. (Atomindex citation 10:482003)

UR-3490-1878 PC **A05**/MF **A01**
Rochester Univ., NY. Dept. of Radiation Biology and Biophysics.
Brief Description of Research Papers Accepted for Publication During 1979. Annual Report.
D. B Nash. 16 Jun 80, 95p
Contract AC02-76EV03490

Brief descriptions of research papers in radiobiology, biochemistry, metabolism, and biophysics published during 1979 are presented. The research was conducted by investigators in the Dept. of Radiation Biology and Biophysics. (ERA citation 05:034183)

WAPD-TM-1275 PC **A09**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
AIRWAY: A Fortran Computer Program to Estimate Radiation Dose Commitments to Man from the Atmospheric Release of Radionuclides.
J. L. Rider. Jun 79, 195p
Contract EY-76-C-11-0014

The AIRWAY computer program was developed to estimate the radiation dose commitments accured by all the people affected by the atmospheric release of radionuclides from a nuclear facility. This computer program provides dose commitment estimates for people on the boundary of the facility, in the immediate vicinity (i.e., within 80 to 100 km) and in the portios of the world beyond the immediate vicinity which are affected by the release. The AIRWAY program considers dose commitments resulting from immersion in the atmosphere containing the released radionuclides, ingestion of contaminated food, inhalation of gaseous and suspended radioactivity, and exposure to ground deposits. The dose commitments for each of these pathways is explicitly calculated for each radionuclide released into the atmosphere and for each daughter of each released radionuclide. This is accomplished by calculating the air and ground concentrations of each daughter in each of the regions of interest using the release rate of the parent radionuclide. The AIRWAY computer program is considered to be a significant improvement over other programs in which the effect of daughter radionuclides must be approximated by separate releases. (ERA citation 04:055603)

6S. Stress Physiology

AD-A108 198/3 PC **A03**/MF **A01**
Naval Submarine Medical Research Lab., Groton, CT.
The Relationship of Job Performance to Physical Fitness and Its Application to U. S. Navy Submariners.
Interim rept.,
Brad L. Bennett, and Kenneth R. Bondi. 29 Sep 81, 27p Rept no. NSMRL-962

During a nuclear submarine patrol (SSN/SSBN) physical activity is severely curtailed for a majority of individuals because of the closed confines of the submarine. Work schedules and studying for self-advancement may also contribute to an inhibition of exercise even in submariners normally motivated to exercise. Two resultant effects of physical deconditioning are a rapid decrement in one's maximal oxygen consumption (VO2 max) and an increasing development of anxiety and depression. Furthermore, submariners are known to have a high caloric intake, high coffee ingestion, and a high rate of smoking. It is well known that these factors all contribute to the development of coronary artery disease (CAD). The question of whether career submariners are predisposed to a premature development of CAD has not been resolved. Implementation of a shipboard exercise program will prevent physical deconditioning and will maintain a sense of well-being during patrol and ultimately may lead to increased effectiveness and efficiency of the submarine crew. (Author)

AD-A108 639/6 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Acceleration Stress-Induced Wolff-Parkinson-White Syndrome with Marked ST-Segment Depression.
Final rept.,
James E. Whinnery. 1981, 5p Rept no. SAM-TR-81-218
Pub. in Aviation, Space, and Environmental Medicine, v52 n11 p654-657 Nov 81.

No abstract available.

N82-13653/2 PC **A06**/MF **A01**
Ingenieurbuero fuer Ergonomie, Munich (Germany, F.R.).
Influence of Sine, and Random, Whole-Body Vibration on Visual Acuity Einfluss Sinusfoermiger und Regelloser Ganzkoerperschwingungen Auf die Visuelle Informationsaufnahme.
N. May. 1979, 101p BMVG-FBWT-79-17
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

The far, visual acuity of people subjected to vertical whole-body vibration (different vibration types and loads) was tested. A total of 110 subjects of both sexes, either exposed to sine vibration in the range from 2 to 18 cycles/sec or to random vibrations in the same frequency range, participated. The rms accelerations on the heads of subjects were 0.17, 0.3 and 0.43 m/sec squared. The subjects sat erect on an uncushioned seat, mounted on a hydromechanical vibration apparatus. Results show that relative visual acuity diminishes with sine vibrations while increasing frequency and/or accelerations (from 6% minimum to 37.5 % maximum of visual acuity under static conditions). With random vibrations there is also an acuity decrease although smaller, while increasing the vibration frequency as well as with increasing acceleration load.

N82-13654/0 PC **A03**/MF **A01**
Freie Univ. Berlin (Germany, F.R.). Physiologisches Inst.
The Measurements of Fluid Shifts and of the Tissue Compliance Along Body Axis in Man.
Final Report.
K. Kirsch. Sep 80, 41p BMFT-FB-W-80-011, ISSN-0170-1339
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Tissue volume changes on different parts of the body were simultaneously measured by ultrasonic techniques in order to monitor the shift of fluid volumes along the body axis. Once fully established, the method could be used for measuring the shift of blood and interstitial fluid from the lower to the cephalic part of the body, occurring under zero-gravity conditions. Proof of principle tests were carried out under orthostatis, immersion and heat exposure conditions were confirmed by post mortem comparisons. By mounting the measuring probe in an airtight chamber, the tissue compliance $C = dV/dP$ was also determined. The results found are consistent with previous investigations and with clinical tests. Application in space and as a circulation diagnostic method is advocated.

6T. Toxicology

AD-A108 319/5 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Effects of Acid and Bile Salts on the Rabbit Esophageal Mucosa,
John W. Harmon, Lawrence F. Johnson, and Corinne L. Maydonavitch. 14 Apr 80, 10p
Pub. in Digestive Diseases and Sciences, v26 n1 p65-72 Jan 81.

No abstract available.

AD-A108 377/3 PC **A06**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.

Molecular Interactions of High Energy Fuels and Jet Fuels with Oncogenic Viruses and Endogenous Viruses.
Annual rept. 31 Jul 80-15 Sep 81,
James R. Blakeslee, Jr. Oct 81, 110p AFOSR-TR-81-0765
Contract F49620-80-C-0087

The objectives of this research are to develop rapid in-vitro assays to evaluate the carcinogenic potential of chemicals used by the U.S. Air Force. Snyder-Theilen Feline Sarcoma Virus (ST FeSV), quantitatively transforms human skin fibroblasts following second order kinetics. These studies were performed in order to determine whether chemicals altered ST FeSV transformation in a predictable manner and to correlate the alteration with the carcinogenic or non-carcinogenic activity of the text chemical. The results, to date, show diverse carcinogens classed as: aromatic amines, polycyclic hydrocarbons, Aminofluorenes, hydrazines, asbestos and mycotoxins inhibited virus transformation when virus infected cells (2 hours post-infection) were exposed to test chemical, while non-carcinogenic chemicals had no significant effect on transformation. Triton X-100, acetone, petroleum and shale oil derived JP5; RJ5 and diesel fuel, marine, demonstrated non-carcinogenic activity while formaline demonstrated carcinogenic activity. Experiments designed to show the specificity of the antagonistic effect of known carcinogens are reported. Disulfuram inhibits biotransformation of 1,2 symmetrical dimethyl hydrazine (SDMH) metabolites, azomethane to azoxymethane (ultimate carcinogen) thereby preventing carcinogenic effect of the proximate carcinogen SDMH. Detailed methodology required to ascertain effect of chemicals on ST FeSV pro-virus integration and synthesis are presented.

AD-A108 447/4 PC **A16**/MF **A01**
IIT Research Inst., Chicago, IL.
Thirteen Week Oral (Diet) Toxicity Study of Trinitrotoluene (TNT), Hexahydro-1,3,5-Trinitro-1,3,5-Triazine (RDX) and TNT/RDX Mixtures in the Fischer 344 Rat.
Final study rept. no. 1, Oct 79-Sep 80,
Barry S. Levine, E. Marianna Furedi, Donovan E. Gordon, John M. Burns, and Paul M. Lish. Sep 81, 357p
Contracts DAMD17-79-C-9120, DAMD17-79-C-9161

This study was conducted to evaluate the toxicity of the munitions compounds 2,4,6-trinitrotoluene (TNT; CAS Reg. No. 118-96-7) and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX; CAS Reg. No. 121-82-4), and their potential toxic interactions in Fischer 344 rats when administered in the diet for at least 13 weeks. The data derived were also to be used to select dose levels for comprehensive chronic toxicity/carcinogenicity studies. Groups of 10 rats per sex received TNT at doses of 1, 5, 25, 125 or 300 mg/kg/day; RDX at doses of 10, 30, 100, 300 or 600 mg/kg/day; and the following combinations of these compounds: TNT 5/RDX 30 mg/kg/day, TNT 5/RDX 300 mg/kg/day, TNT 125/RDX 30 mg/kg/day, TNT 125 RDX 100 mg/kg/day, and TNT 125/RDX 300 mg/kg/day. Thirty rats per sex served as controls. Toxicologic endpoints included clinical signs, body weight, food consumption, hematology, clinical chemistry, organ weights, and gross and tissue morphology. An appropriate 10% reduction in body weight gain was seen for males receiving TNT 5 or 25 mg/kg/day, and for females administered TNT 125 mg/kg/day. Other toxic effects following the administration of TNT 25 mg/kg/day or greater included reduced food intake, hypercholesterolemia and anemia (reduced hemoglobin, hematocrit and erythrocyte counts). Splenomegaly with congestion and hemosiderosis of the red pulp, hepatomegaly with hepatocellular hypertrophy, testicular atrophy with degeneration of the seminiferous tubular epithelium and slight increases in kidney weights with deposition of pigment were also seen for rats receiving TNT 125 or 300 mg/kg/day. Elevated methemoglobin levels and cerebellar lesions were observed only at the TNT 300 mg/kg/day dose level.

AD-A108 637/0 PC **A02**/MF **A01**
Army Medical Bioengineering Research and Development Lab., Fort Detrick, MD.
A New Technique for Automatic Monitoring of Fish Ventilatory Patterns and Its Possible Use in Screening Tests for Chronic Toxicity,
W. H. van der Schalie. 1981, 11p
Pub. in Aquatic Toxicology, ASTM STP 707, p233-242 1980.

No abstract available.

AD-A108 668/5 PC **A02**/MF **A01**
Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD.
Topical Hazard Evaluation Program of Candidate Insect Repellents, US Department of Agriculture Proprietary Chemicals, October 1978 - September 1981.
Final rept.,
Michael J. Topper, and John G. Harvey, Jr. 9 Dec 81, 12p USAEHA-75-51-0182-82, USAEHA-75-51-0183-82, USAEHA-75-51-0184-82, USAEHA-75-51-0185-82
Also available as Rept. nos. USAEHA-75-51-0186-82, USAEHA-75-51-0187-82, USAEHA-75-51-0188-82, USAEHA-75-51-0189-82, USAEHA-75-51-0192-82 and USAEHA-75-51-0242-82.

Preliminary hazard evaluations of the above candidate insect repellent chemicals were performed by means of laboratory animal studies using rats, rabbits, and guinea pigs. Chemicals AI3-37565, 37567, 37569, 37570, 37571, 37572, 37574 and 38010 did not cause any skin irritation. Chemical AI3-37566 and 37578 caused mild primary skin irritation. Chemical AI3-37574 was noninjurious to the eyes of rabbits. Chemicals AI3-37565 and 37572 caused mild injury to the cornea and chemicals AI3-37566, 37567, 37569, 37570, 37571, 37578, and 38010 caused mild injury to the cornea and, in addition, some injury to the conjunctiva. All chemicals were relatively nontoxic by ingestion and did not cause photoirritation or prove to be skin sensitizers. Chemicals AI3-37570 and 37574 demonstrated some skin irriration from ethanol solutions during photoirritation studies. It was recommended that all chemicals be approved for further testing as candidate insect repellents. (Author)

N82-13571/6 PC **A03**/MF **A01**
Service de la Programmation de la Politique Scientifique, Brussels (Belgium).
National Research and Development Program: Environmental Air. Summary Programme National R-D: Environnement Air.
Final Report, 1975-1978.
1979, 40p
Text in French. Original Contains Color Illustrations.

The air quality in and around Gent, Belgium, was studied. Results presented cover pollution transport, epidemiology (pulmonary and respiratory diseases), and measures of interior versus exterior contaminant concentrations. Modeling software for meteorology, emissions monitoring, methodology of environment monitoring, and the economic implications of the fight against air pollution are also discussed.

PB82-139684 PC **A04**/MF **A01**
Statens Levnedsmiddelinstitut, Soeborg (Denmark).
Heavy Metal Pollution of Fruit and Vegetables Grown in the Western Part of Copenhagen, 1978 (Tungmetalforurening of frugt of Grontsager Dyrket i Koebenhavns Vestegn, 1978),
Erik H. Larsen. Jun 80, 55p ISBN-87-503-3193-0, PUB-41
Text in Danish, summary in Danish and English.

In 1978 kale, carrots, lettuce, leeks, potatoes and apples were grown at 18 locations in the vicinity of two metal manufacturing industries in the western part of Copenhagen, one of which is a secondary lead smelter (name abbreviated PBS). The aims of this investigation were to monitor the level of lead, cadmium, copper, zinc, antimony and arsenic in locally grown crops, and to evaluate the significance of an eventual high concentration level as part of the total intake of these metals via the diet.

PB82-139692 PC **A04**/MF **A01**
Statens Levnedsmiddelinstitut, Soeborg (Denmark).
Investigations on Formation and Occurrence of Volatile Nitrosamines in Danish Cheese.
Feb 80, 72p ISBN-87-503-3257-0

This report describes the investigations concerning occurrence and formation of volatile nitrosamines in cheese made in Denmark in 1977 and 1978. With a view to providing a total description of the problems concerning nitrosamines in cheese, the report also reviews previous investigations of nitrosamines in cheese in other countries and the toxic effects of nitrosamines. Further, the reasons for using saltpetre in producing certain cheese types are dealt with. In the report various abbreviations and technical terms have been used, and these have been explained in a special section.

PB82-140773 PC **A08**/MF **A01**
Development Planning and Research Associates, Inc., Manhattan, KS.
Chemical Testing Industry Profile of Toxicological Testing.
Final rept.,
Samuel G. Unger, Daniel W. Francke, Stuart L. Fribush, Geneva S. Hammaker, and Frank D. Lerman. Oct 81, 172p EPA-560/4-81-003
Contracts EPA-68-01-6064, EPA-68-01-6287
Prepared in cooperation with ICF, Inc., Washington, DC.

The study assists the EPA in evaluating the foreseeable availability of the facilities and personnel needed to perform the toxicological testing required under the Toxic Substances Control Act. The study profiles the toxicological testing industry which is estimated to contain 285 commercial toxicology laboratories with average employment of 57 per laboratory and average laboratory space, 28,000 sq. ft. Annual revenues for the industry are estimated at $650 million or $2.3 million per laboratory and market competition is high with no individual firm or small group of firms controlling key resources. The current supply of testing resources is adequate with industry utilization at about 80 to 85 percent. Capital and professional manpower are key resources. Demand for testing and testing resources should be strong and arises from regulatory sources including TSCA, FIFRA and FFDCA and non-regulatory sources. Finally, a conceptual supply/demand model shows it is possible to simulate and assess the potential economic impacts of regulatory changes as well as changes in prices, availability of resources and industry structure, but data and resource requirements to implement such a model would be substantial.

PB82-142720 PC **A05**/MF **A01**
Utah Biomedical Test Lab., Salt Lake City.
Planning Report for Toxicological Research,
S. D. Allen, and E. Graham. 26 Jun 75, 90p TR-177-02
Contract PHS-CDC-99-74-110

A system is developed to define agricultural, occupational toxicology research needs and problem areas using the best available knowledge and data. Using a priority list developed by the ARAL Information Section and inputs from other sources, ethyl parathion, methyl parathion, guthion, carbophenothion, anhydrous ammonia, paraquat, methyl bromide, carbaryl, ethylene dibromide, and ethylene dichloride are selected for in-depth investigation. Also studied are pesticides and reproductive function, pesticides and the immune system, pesticides and the eye, agricultural aviation, pesticides and neurobehavioral function, chronic effects of pesticides, and pesticides and cancer.

PB82-147414 PC **A15**/MF **A01**
JRB Associates, Inc., McLean, VA.
Review of Literature on Herbicides, Including Phenoxy Herbicides and Associated Dioxins: Volume I. Analysis of Literature.
Final rept.
Oct 81, 338p 2/816/03/744/00, VA/JRB-0001
Contract V101(93)P-823
See also Volume 2, PB82-147422.

Public Law 96-151 enacted December 20, 1979, mandated the Veterans Administration to conduct '... a comprehensive review and scientific analysis' of the worldwide literature on Agent Orange and other phenoxy herbicides. The need to conduct such a review was in response to an increasing awareness among veterans, the Congress and the public of the potential long-term health consequences of exposure to these herbicides and the contaminant dioxin as used during the Vietnam Conflict. Volume I presents a detailed scientific assessment of the literature concerning U.S. military personnel exposures to herbicides such as 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). The following topics are covered: environmental fate and monitoring; metabolism, enzyme induction and mechanism of action; human exposure to TCDD from industrial and military uses; toxicity and mortality; mutagenicity and carcinogenicity. Each chapter concludes with references.

PB82-147422 PC **A18**/MF **A01**
JRB Associates, Inc., McLean, VA.

Review of Literature on Herbicides, Including Phenoxy Herbicides and Associated Dioxins: Volume II. Annotated Bibliography.
Final rept.
Oct 81, 406p 2/816/03/744/00, VA/JRB-0002
Contract V101(93)P-823
See also Volume 1, PB82-147414.

Public Law 96-151 enacted December 20, 1979, mandated the Veterans Administration to conduct '... a comprehensive review and scientific analysis' of the worldwide literature on Agent Orange and other phenoxy herbicides. The need to conduct such a review was in response to an increasing awareness among veterans, the Congress and the public of the potential long-term health consequences of exposure to these herbicides and the contaminant dioxin as used during the Vietnam Conflict. Volume II contains an annotated bibliography of the relevant literature, i.e., about 1,200 documents identified as relevant to the review of the scientific literature on the environmental fate and toxicity of herbicides, including phenoxy herbicides, and associated dioxins, used in South Vietnam. Over 900 of these citations, those dealing primarily with health effects, are accompanied by annotations; relevant abstracts, summaries, review articles, editorials, and documents used for background material are included in the bibliography, but are not annotated. Herbicides described in this literature include: Herbicides Orange, Orange II, Purple, Pink, Green, White, Blue (cacodylic acid), Dinoxol, Trinoxol, Bromacil, Diquat, Tandex, Monuron, Diuron, and Dalapon.

PB82-148404 PC **A19**/MF **A01**
Raltech Scientific Services, Inc., Madison, WI.
Preclinical Intravenous Toxicity Study of Pentaazaacenaphthylene-5' Phosphate Ester (NSC No. 280594) in CDF1 Mice and Beagle Dogs: Phase II Report.
Final rept. May 80-Jul 81,
G. N. Rao, B. Boysen, G. Thompson, B. Dickie, and S. Glaza. Jul 81, 438p RAL-80039/80044, RAL-81/1003
Contract N01-CM-1-7365

Single and Five Daily Dose Lethality Studies in Mice. Groups of CDF1 mice were administered graded doses of Pentaazaacenaphthylene-5' phosphate ester (NSC-280594) by intravenous injection (single dose study and a five daily dose study). The final LD(10), LD(50), and LD(90), respectively, are as follows: Single Dose - Male: 233.5, 287.8, 354.8 mg/kg; 700.5, 863.4, 1064 mg/sq m. Single Dose - Female: 222.9, 256.8, 295.9 mg/kg; 668.7, 770.4, 887.7 mg/sq m. Single Dose - Combined Sexes: 225.0, 273.0, 331.2 mg/kg; 675.0, 819.0, 993.6 mg/sq m. Five Daily Dose - Male: 89.0, 139.4, 218.3 mg/kg/day; 267.0, 418.2, 654.9 mg/sq m/day. Five Daily Dose - Female: 113.3, 143.0, 180.4 mg/kg/day; 339.9, 429.0, 541.2 mg/sq m/day. Five Daily Dose - Combined Sexes: 102.6, 140.9, 193.5 mg/kg/day; 307.8, 422.7, 580.5 mg/sq m/day. The major pharmacotoxic signs observed were hypoactivity, ruffled fur, ataxia, decreased limb tone, bradypnea and impaired use of hind limbs. There was an apparent dose response relationship in regard to dose level and recovery from weight loss.

PB82-935900 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Chemical Carcinogenesis: Azo Dyes, Aryl Amines, and Related Compounds.
Cancergram CK10.
1982, 12 issues
Supersedes PB81-935900.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This agent-oriented Cancergram deals with carcinogenicity of fluorene derivatives, azo compounds, naphthylamines, nitroguinoline oxides, and other related specific substances (including hair dyes). The scope includes carcinogenicity and modification of carcinogenicity, metabolic, physiologic and morphologic effects, mutagenicity and in vivo testing, studies of human exposure, chemical and physical properties, and analytic methods. The Cancergram generally excludes studies where the compounds are used simply as a means of inducing experimental tumors for other studies, and specifically excludes aromatic nitrosamines (covered by Cancergram series CK01) and aromatic halogen compounds (covered by Cancergram series CK13).

PB82-936400 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Chemical Carcinogenesis: Miscellaneous Agents.
Cancergram CK13.
1982, 12 issues
Supersedes PB81-936400.
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram deals with all aspects of experimental carcinogenesis induced by a variety of chemical agents which have not been specifically covered by other Cancergrams of this series. Included among these agents are hydrazines; heterocyclic compounds; asbestos, metals, and other inorganic substances; amides and related compounds; amino acid analogs; aliphatic and aromatic halogenated compounds; benzene derivatives; and miscellaneous commercial products. The Cancergram covers, in general, the induction of cancer, mechanisms of carcinogenesis, and morphological, physiological, biochemical, and toxicological effects of the agents that are relevant to their carcinogenic properties. Many of these agents are identified because of high exposure for humans; however, their relationship to human cancer is generally excluded from the scope of this Cancergram, as this subject is comprehensively covered in Cancergram CK02. Because they are the subject of other Cancergrams of this series, other topics excluded from this Cancergram are studies limited to the carcinogenicity of nitroso compounds (see CK01), polycyclic aromatic hydrocarbons (see CK07), and azo dyes and aryl amines (see CK10). This Cancergram also excludes studies of anticarcinogenic agents unless they relate to mutagenicity or carcinogenicity.

SAND-80-0576 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Analysis of the Impact of the Regulation of Toxic Substances on Sandia.
C. Arnold, Jr., and J. Pigg. Oct 80, 22p
Contract AC04-76DP00789

In recent years, Congress has passed two regulatory acts, namely the Occupational Safety and Health Act (OSHA) and the Toxic Substance Control Act (TSCA) which seek to control the manufacture, use, and disposal of hazardous chemical substances. These acts can have a significant impact on Sandia's missions and will particularly affect those organizations involved in materials development and selection. The primary purpose of this report is to describe in some detail the impact of these acts on Sandia's corporate goals and make recommendations on what our response should be. Also described in this report is the present position of Sandia with respect to these regulatory acts and the policies and actions that Sandia has taken to date in an effort to minimize their impact. (ERA citation 06:004262)

7. CHEMISTRY

7A. Chemical Engineering

DOE/MC/02615-T1 PC **A07**/MF **A01**
Mechanical Technology, Inc., Latham, NY.
Assessment of HYGAS Mechanical Equipment.
P. R. Albrecht, F. E. Kramberger, R. M. Recupero, M. L. Verden, and K. Rees. Oct 80, 137p MTI-80TR10
Contract AT21-77MC02615

The HYGAS process, which converts coal to substitute natural gas, is being developed by the Institute of Gas Technology (IGT) using an 80 ton per day pilot plant located in Chicago, Illinois. Plant design started in 1967 and testing began in October 1971. Since then, 18,000 tons of both Eastern and Western coal have been gasified. Assessment of the mechanical equipment was made by Mechanical Technology Incorporated (MTI) in collaboration with a DOE on-site representative and a representative from IGT, the operating contractor. Data for the assessment were obtained by reviewing all available maintenance records, by interviewing key personnel from maintenance and operations, and by observing repairs and maintenance procedures where possible. While operating the plant, a variety of equipment problems were addressed, many of which are generic to HYGAS as well as other coal conversion processes. Some problems were solved completely while others were solved to suit the limited needs of the pilot plant. Accordingly, the emphasis of this study is on the degree of success in dealing with equipment failures, the unresolved problems and the implication to future coal conversion plants. (ERA citation 06:003315)

FE-2012/Z/80/06(V.3)(Bk.1)
PC **A13**/MF **A01**
Illinois Coal Gasification Group, Chicago.
Pipeline Gas Demonstration Plant: Phase I, Abbreviated Version of Conceptual Commercial Plant Design. Volume 3. Book 1: Section 4, Detailed Area Concept and Descriptions (Plant Areas 101 Through 112).
R. J. Eby. Jul 80, 288p
Contract AC01-77ET13031

This section describes the 20 plant areas that make up the ICGG Conceptual Commercial Plant. Process flows, descriptions, design basis, equipment specifications, utility requirements, etc., are provided for each plant area. (ERA citation 05:037485)

FE-3245-21 PC **A06**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Simultaneous High Temperature Removal of Alkali and Particulates in a Pressurized Gasification System. Annual Technical Progress Report, October 1979-September 1980.
P. R. Mulik, D. F. Ciliberti, M. A. Alvin, M. M. Ahmed, and D. L. Keairns. Oct 80, 117p
Contract AC21-78ET11026

An advanced low-Btu gasification system, when integrated with a combined cycle power plant, results in one of the most promising concepts for using low-Btu gasifiers, and hence leads the way to using high-sulfur coal. Using this coal to generate a fuel gas requires the removal of contaminants (especially alkali and particulates) which could lead to corrosion, erosion, and deposition problems on turbine materials. A cleanup system is therefore obligatory. In the present study, Westinghouse is examining the feasibility of a hot gas cleaning process to minimize the concentration of alkali in a high-temperature fuel gas with simultaneous particulate removal through the use of aluminosilicate materials (getters). There are four program objectives. The gettering capacity will be kinetically defined by thermogravimetric analysis of three selected getters - kaolinite, ash from a low-temperature coal char, and ash from a high-temperature gasifier. Using detailed chemical and physical analyses of the reacted aluminosilicates, the gettering mechanism will be delineated as either a chemical or a sorption process. System performance projections, for a coupled alkali and particulate removal system, will be developed from the fundamental kinetic and thermodynamic data. Finally, the system performance projections will be utilized to define a plan for concept scale-up. (ERA citation 06:010129)

N82-13497/4 PC **A03**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Large Area Sheet Task: Advanced Dendritic Web Growth Development.
Quarterly Report, 1 Apr. - 30 Jun.
C. S. Duncan, R. G. Seidensticker, J. P. Mchugh, R. H. Hopkins, and D. Meier. 6 Oct 81, 39p NASA-CR-165013, JPL-9950-605
Contract JPL-955843
Sponsored in Part by Doe Prepared for JPL, Pasadena.

The growth of silicon dendritic web for photovoltaic applications was investigated. The application of a thermal model for calculating buckling stresses as a function of temperature profile in the web is discussed. Lid and shield concepts were evaluated to provide the data base for enhancing growth velocity. An experimental web growth machine which embodies in one unit the mechanical and electronic features developed in previous work was developed. In addition, evalua-

tion of a melt level control system was begun, along with preliminary tests of an elongated crucibl design. The economic analysis was also updated to incorporate some minor cost changes. The initial applications of the thermal model to a specific configuration gave results consistent with experimental observation in terms of the initiation of buckling vs. width for a given crystal thickness.

N82-13498/2 PC **A04**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Flat-Plate Solar Array Project: Experimental Process System Development Unit for Producing Semiconductor-Grade Silicon Using the Silane-to-Silicon Process.
Quarterly Progress Report, Jul. - Sep. 1981.
Sep 81, 56p NASA-CR-165022, JPL-9950-606
Contract JPL-954334
Sponsored in Part by Doe Prepared for JPL, Pasadena, Calif.

The engineering design, fabrication, assembly, operation, economic analysis, and process support research and development for an Experimental Process System Development Unit for producing semiconductor-grade silicon using the slane-to-silicon process are reported. The design activity was completed. About 95% of purchased equipment was received. The draft of the operations manual was about 50% complete and the design of the free-space system continued. The system using silicon power transfer, melting, and shotting on a psuedocontinuous basis was demonstrated.

N82-13500/5 PC **A13**/MF **A01**
Kayex Corp., Rochester, NY.
Continuous Czochralski Growth: Silicon Sheet Growth Development of the Large Area Sheet Task of the Low Cost Silicon Solar Array Project.
Final Report, 1 Oct. 1977 - 31 Mar. 1980.
C. M. Johnson. Dec 80, 292p NASA-CR-165030, JPL-9950-610
Contract JPL-954888
Sponsored in Part by Doe Prepared for JPL, Pasadena, Calif.

The growth of 100 kg of silicon single crystal material, ten cm in diameter or greater, and 150 kg of silicon single crystal material 15 cm or greater utilizing one common silicon container material (one crucible) is investigated. A crystal grower that is recharged with a new supply of polysilicon material while still under vacuum and at temperatures above the melting point of silicon is developed. It accepts large polysilicon charges up to 30 kg, grows large crystal ingots (to 15 cm diameter and 25 kg in weight), and holds polysilicon material for recharging (rod or lump) while, at the same time, growing crystal ingots. Special equipment is designed to recharge polysilicon rods, recharge polysilicon lumps, and handle and store large, hot silicon crystal ingots. Many continuous crystal growth runs were performed lasting as long as 109 hours and producing as many as ten crystal ingots, 15 cm with weights progressing to 27 kg.

ORNL/TM-7144 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Fossil Energy Program. Progress Report for October 1979.
L. E. McNeese. Dec 79, 79p
Contract W-7405-ENG-26

This report, the sixty-third of a series, is a compendium of monthly progress reports for the ORNL research and development programs that are in support of the increased utilization of coal and other fossil fuel alternatives to oil and gas as sources of clean energy. The projects reported this month include those for coal conversion development, materials engineering, a coal equipment test program, an atmospheric fluid bed combustor for cogeneration, engineering studies and technical support, process and program analysis, environmental assessment studies, magnetic beneficiation of dry pulverized coal, technical support to the TVA fluid bed combustion program, coal cogeneration/district heating plant assessment, chemical research and development, and technical support to major liquefaction projects. (ERA citation 05:008004)

PB82-145913 PC **A05**/MF **A01**
National Research Council, Washington, DC.
Feeding Value of Ethanol Production By-Products.
Mar 81, 82p ISBN-0-309-03136-2
Library of Congress catalog card no. 81-4396. Sponsored in part by Department of Agriculture, Washington, DC.

Efficient utilization of by-products is vital to the economic viability of ethanol production. Currently, returns from marketing of by-products can offset as much as 50 percent of the initial cost of conventional feedstocks used in ethanol production (Black et al., 1981). As ethanol production increases in the United States, the additional quantity of by-products must be integrated in animal feeding systems if this relationship is to be maintained.

PB82-153503 PC **A05**/MF **A01**
Applied Technology Corp., Norman, OK.
Development of an Improved LNG Plant Failure Rate Data Base.
Final rept. Mar 80-Jun 81,
D. W. Johnson, and J. R. Welker. Sep 81, 86p GRI-80/0093
Contract GRI-5080-352-0298

Questionnaires were sent to LNG plant operators requesting data on failures of gas pretreatment systems, vaporizers, compressors, valves, piping, storage tanks, fire and leak detection systems, etc. The responses were combined to broaden the failure rate data base for major LNG plant equipment. The results generally agree with data found in an earlier survey. The results will be useful for individual plants in performing fault tree analyses to determine methods of improving plant reliability. Data on human failure rates were weak and additional human error research may be required.

SAN-1848-T3(V.1) PC **A05**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Technical Feasibility Demonstration Unit. Volume 1. Summary Operating Cost Estimate and Capital Cost Estimate.
Mar 79, 89p
Contract ET-78-C-03-1848

This volume presents a definitive capital cost and operating cost estimate for a nominal 2500-bbl/d technical feasibility demonstration unit for the treatment of shale oil. The estimate includes both mine and processing plant costs. Geology, hydrology, mine, process systems, water management, and general facilities are discussed. (ERA citation 05:014842)

SAN-1848-T3(V.2) PC **A14**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Technical Feasibility Demonstration Unit. Volume 2. Capital Cost Estimate, Areas 2 Through 26.
Mar 79, 305p
Contract ET-78-C-03-1848

These areas include the following mine items: equipment, temporary gas shaft, air level, intermediate levels, production level, retort module A-1, and process/products recovery system. (ERA citation 05:014843)

SAN-1848-T3(V.3) PC **A16**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Technical Feasibility Demonstration Unit. Volume 3. Capital Cost Estimate, Areas 27, 29, and 34.
Mar 79, 352p
Contract ET-78-C-03-1848
Portions of document are illegible.

These areas of the 2500-bbl/day design are mine dewatering, mine general facilities, and surface water facilities. (ERA citation 05:014844)

SAN-1848-T3(V.4) PC **A16**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Technical Feasibility Demonstration Unit. Volume 4. Capital Cost Estimate, Area 36, Part 1.
Mar 79, 366p
Contract ET-78-C-03-1848

This volume covers surface process facilities of the 2500-bbl/d unit: packaged plants, hoists, columns, vessels, heat exchangers, furnaces, pumps, boilers, compressors/blowers, storage tanks, separation equipment, agitators, transfer/rolling stock, concrete work and piling, and pipes, valves, and fittings. (ERA citation 05:014845)

SAN-1848-T3(V.5) PC **A09**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Technical Feasibility Demonstration Unit. Volume 5. Capital Cost Estimate, Area 36, Part 2.
Mar 79, 181p
Contract ET-78-C-03-1848

This volume for the 2500-bbl/d capacity design covers the cost of structural steel, instruments and controls, printing, electrical equipment, insulation, buildings, various pipes and lines, and ducts. (ERA citation 05:014846)

SAN-1848-T3(V.6) PC **A15**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Technical Feasibility Demonstration Unit. Volume 6. Capital Cost Estimate, Area 43.
Mar 79, 336p
Contract ET-78-C-03-1848

This volume covers the capital costs of the following surface facilities and work of the 2500-bbl/d capacity design: emergency generators, packaged plants, hoists, vessels, exchangers, pumps, boilers, cooling towers, compressors, tanks, separation equipment, concrete work and piling, piping, structural steel, instruments and controls, painting, electrical equipment, insulation, roads, buildings, drains, site preparation, and other civil work. (ERA citation 05:014847)

SAN-1848-T3(V.7) PC **A05**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Technical Feasibility Demonstration Unit. Volume 7. Operating Cost Estimate.
Mar 79, 83p
Contract ET-78-C-03-1848

This volume presents the backup calculations used to derive an annual operating cost. The backup calculations cover underground, process, and surface nonprocess aspects. (ERA citation 05:014848)

SAN-1848-T5(V.1) PC **A05**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Commercial Feasibility Demonstration Unit. Volume 1. Summary Operating Cost Estimate and Capital Cost Estimate.
Mar 79, 99p
Contract ET-78-C-03-1848

This volume presents a definitive capital cost and operating cost estimate for a nominal 5000-bbl/d commercial feasibility demonstration unit for the treatment of shale oil. The estimate includes both mine and processing plant costs. (ERA citation 05:014853)

SAN-1848-T5(V.3) PC **A16**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Commercial Feasibility Demonstration Unit. Volume 3. Capital Cost Estimate, Areas 27, 29, and 34.
Mar 79, 362p
Contract ET-78-C-03-1848

These three areas are mine dewatering (pumps, controls), mine general facilities (vessels, pumps, filters, ventilation, equipment, concrete and steel structures, instruments and controls, electrical, buildings, ducts), and surface water facilities. (ERA citation 05:014855)

SAN-1848-T5(V.4) PC **A18**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Commercial Feasibility Demonstration Unit. Volume 4. Capital Cost Estimate, Area 36, Part 1.
Mar 79, 405p
Contract ET-78-C-03-1848

This volume covers surface facilities such as packaged plants, hoists, columns, vessels, heat exchangers, furnaces, pumps, boilers, compressors and boil-

ers, storage tanks, separation equipment, agitators and mixers, other major equipment, transfer/rolling stock, concrete work and piling, and pipes, valves, and fittings. (ERA citation 05:014856)

SAN-1848-T5(V.5) PC **A14**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Commercial Feasibility Demonstration Unit. Volume 5. Capital Cost Estimate, Area 36, Part 2.
Mar 79, 304p
Contract ET-78-C-03-1848

This volume covers structural steel, instruments and controls, painting, electrical, insulation, buildings, and ducts. (ERA citation 05:014857)

SAN-1848-T5(V.6) PC **A16**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Modified in Situ Oil Shale Process, Occidental Oil Shale, Inc.: Commercial Feasibility Demonstration Unit. Volume 6. Capital Cost Estimate, Area 43.
Mar 79, 363p
Contract ET-78-C-03-1848

Area 43 is the surface utilities including electric power, communications, air supply, ancillary emergency power generation, fire protection, utility steam distribution, and sewage disposal, all north of plant grid north 11,000. (ERA citation 05:014858)

SAND-80-0777 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Effects of Insulation for the Steam String of the TS-1S Experiment.
J. R. Wayland. Jul 80, 22p
Contract AC04-76DP00789

The character of the steam quality at the production depth in the Laramie Energy Technology Center's Tar Sand steam injection field experiment is studied. A series of calculations were made using the BORE wellbore heat loss code. The results are given in graphical form along with simple functional fits for use in the field. (ERA citation 05:033292)

7C. Organic Chemistry

AD-A108 369/0 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
Studies Relating to the Synthesis of Monomethylhydrazine by Chloramination and Problem Relating to the Protection of the Environment from the Vapors of 1, 1-Dimethylhydrazine, Monomethylhydrazine and Hydrazine.
Final rept. 1 Oct 79-30 Jun 81,
Harry H. Sisler, and Milap A. Mathur. 30 Sep 81, 8p
AFOSR-TR-81-0769
Grant AFOSR-80-0007

The synthesis of monomethylhydrazine was successfully achieved by reacting solutions of hydroxylamine-O-sulfonic acid with methylamine in diglyme. The synthesis of 1,1-dimethylhydrazine was carried out in a similar manner with dimethylhydrazine. A mechanism for the formation of formaldehyde dimethylhydrazone by the reaction of dimethylamine and chloramine was proposed. A study was conducted on the oxidation of monomethylhydrazine and 1,1-dimethylhydrazine by oxygen. (Author)

AD-A108 486/2 PC **A02**/MF **A01**
Hull Univ. (England). Dept. of Chemistry.
Addition of Pentenes to Slowly Reacting Mixtures of Hydrogen and Oxygen at 480 C.
Interim rept.,
Roy R. Baldwin, Joan P. Bennett, and Raymond W. Walker. 24 Jan 80, 19p AFOSR-TR-81-0751
Grant AFOSR-77-3215
Pub. in JCS Faraday I, v76 p2396-2412 1980.

No abstract available.

N82-13171/5 PC **A03**/MF **A01**
Massachusetts Univ., Amherst. Dept. of Polymer Science and Engineering.
Grafting of 2 (2-Hydroxy-5-Vinylphenyl) 2H-Benzotriazole onto Polymers with Aliphatic Groups. Synthesis and Polymerization of 2 (2-Hydroxy-5-Isopropenylphenyl) 2H-Benzotriazole and a New Synthesis of 2 (2-Hydroxy-5-Vinylphenyl) 2H-Benzotriazole.
Annual Report, 1980 - 1981.
W. Pradellok, Z. Nir, and O. Vogl. 15 Aug 81, 30p
NASA-CR-165016, JPL-9950-608
Contract JPL-955531
Prepared for JPL.

Successful grafting of 2(2-hydroxy-5-vinylphenyl)2H-benzotriazole onto saturated aliphatic C-H groups of polymers has been accomplished. When the grafting reaction was carried out in chlorobenzene at 150 C = 160 C with di-tertiarybutylperoxide as the grafting initiator, grafts as high as 20 percent - 30 percent at a grafting efficiency of 50 percent and 80 percent have readily been obtained. The grafting reaction was carried out in tubes sealed under high vacuum since trace amounts of oxygen cause complete inhibition of the grafting reaction by the phenolic monomer. On a variety of different polymers including atactic polypropylene, ethylene/vinyl acetate copolymer, poly(methyl methacrylate), poly(butyl acrylate), and polycarbonate were used.

PAT-APPL-6-276 768 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Bromine-Containing 2,4-Diaminotriazines.
Patent Application,
Leon H. Chance. Filed 24 Jun 81, 13p PB82-148610
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to new organic compounds and processes for the synthesis of the compounds. More specifically, the invention relates to bromine-containing 2,4-diaminotriazines and to esters used as intermediates in the synthesis of said compounds. The bromine-containing 2,4-diaminotriazines can be used to reduce the flammability of cotton.

PAT-APPL-6-294 203 PC **A02**/MF **A01**
Department of Health and Human Services, Washington, DC.
Nondenaturing Zwitterionic Detergents for Membrane Biochemistry.
Patent Application,
Leonard Hjelmeland. Filed 26 Aug 80, 22p PB82-148511
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a nondenaturing zwitterionic detergent for proteins which, for example, consists of an effective amount of 3-((3-chloamidopropyl)-dimethylammonio)-1-propanesulfonate (CHAPS). This detergent is of extreme interest in the biological study of proteins due to its nondenaturing characteristic. This application is an improved procedure for preparation of these compounds and especially for the last step as for CHAPSO to react the N-(3-dimethylaminopropyl)cholamide with sodium 1-chloro-2-hydroxy-3-propanesulfonate.

PB82-143785 PC **A15**/MF **A01**
Technische Univ., Brunswick (Germany, F.R.). Naturwissenschaftliche Fakultaet (1).
Studies on the Borchelate Formation and Acylation of Variously N-Oxidized Aminoalcohol and Aminocarboxylic acid Derivatives (Untersuchungen zur Borchelatbildung und Acylierung Unterschiedlich N-Oxidierter Aminoalkohol und Aminocarbonsaeure-Derivate),
Juergen Graumann. 30 Oct 80, 350p
Text in German.

Comparative studies were carried out on isomeric O-(2-hydroxyalkyl)-N,N-dialkylhydroxylamines and N-(2-hydroxyalkyl)-N,N-dialkylamine-N-oxides; the reactions of isomeric N-hydroxy-alpha-amino- and alpha-aminooxycarboxylic acids with diphenylboric anhydride were investigated; the reactions of N-alkyl-N-hydroxy-alpha-amino acids with diphenylboric anhydride and phenylboric acid were investigated; the reactions of N,N-dialkylamino acids and N,N-dialkylamino acid-N-oxides with diphenylboric anhydride were investigated; and the structure and reactivity of nitrones of N-hydroxyamino acids were examined. All compounds formed borchelates; however, the stability of the products was different depending on the physical and chemical characteristics, such as basicity and nucleophilicity. Efforts to synthesize the ketonitrones of N-hydroxy-alpha-amino acids were unsuccessful alpha-aminocarboxylic acids formed stable diphenylborchelates; however, the isomeric N-hydroxy-alpha-amino acids formed relatively unstable six-ring chelates. The diphenylborchelate of N-hydroxy-2-phenyglycine formed a stable 2-imino-2-phenylacetic acid chelate. N,N-dialkylamino acids formed stable diphenylborchelates, except the N,N-dipropylglycine. Only cyclic products were obtained by carbamoylation with 3-chlorophenylisocyanate and acylation with acid halides and acetic anhydride of nitrones. Under some conditions, aldonitrones of N-hydroxy-beta-alanine form diphenylborchelates. The dissertation cites 176 references to the literature.

ZfK-356 PC **A02**/MF **A01**
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German D.R.)
Synthesis of (14 alpha , 15 alpha - exp 3 H)-17 alpha -Cyanomethyl-17 beta -Hydroxyestra-4,9-Diene-3-One - a Specifically Tritium Labelled Gestagen.
J. Roemer, and H. Wagner. May 78, 16p
In German.
U.S. Sales Only.

Synthesis of (14 alpha , 15 alpha - exp 3 H sub 2)-17 alpha -cyanomethyl-17 beta -hydroxyestra-4,9-diene-3-one from quantitativly tritiated (14 alpha , 15 alpha - exp 3 H sub 2)-3-methoxyestra-1,3,5(10),8-tetraene-17 beta -ol is described. The determination of the radiochemical purity and chemical yield was carried out by thin-layer chromatography. Preparative thin-layer chromatography was used for purifying the final product. By-products formed in the course of synthesis could be detected by determining and comparing specific activities of the intermediate products. Radiolytic investigations revealed the instability of the tritium labelled dienone system. (Atomindex citation 10:481716)

7D. Physical Chemistry

AD-A108 193/4 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Laser Induced Fluorescence from the A (2)Pi sub i(v=0) State of CO(+),
D. H. Katayama, and Judy A. Welsh. 11 May 81, 10p
Rept no. AFGL-TR-81-0336
Pub. in Jnl. of Chemical Physics, v75 n9 p4224-4230, 1 Nov 81.

No abstract available.

AD-A108 195/9 PC **A03**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Chemistry.
Some Comparisons between the Energetics of Electrochemical and Homogeneous Electron-Transfer Reactions.
Technical rept.,
Michael J. Weaver, and Joseph T. Hupp. 23 Nov 81, 35p Rept no. TR-6
Contract N00014-79-C-0670

Some conceptual relationships between the kinetics of corresponding electrochemical and homogeneous redox processes are discussed and applied to experimental data for suitable outer-sphere reactions in order to illustrate the utility of electrochemical kinetics for gaining some fundamental insights into the energetics of electron-transfer processes. It is pointed out that electrochemical kinetics and thermodynamics measurements as a function of temperature and electrode potential yield direct information on the shapes of the potential-energy surfaces and free energy barriers for individual redox couples. Comparisons between kinetics parameters for corresponding electrochemical and homogeneous exchange reactions show reasonable agreement with the predictions of the conventional 'weak overlap' model for several aquo redox couples, but exhibit substantial disagreement for couples containing amine and related ligands. These latter discrepancies may arise from the closer approach of the amine reactants to the electrode surface compared with the strongly solvated aquo complexes. A comparison is also made between the effects of varying the thermodynamic driving force upon the kinetics of related electrochemical and homogeneous reac-

tions. It is shown that the apparent discrepancies seen between the predictions of the harmonic oscillator model and experimental data for some highly exoergic homogeneous reactions may be related to the anomalously small dependence of the rate constant upon overpotential observed for the electrooxidation of aquo complexes. This behavior seems most likely to be due to a marked asymmetry of the reactant and product free energy barriers for these half reactions.

AD-A108 220/5 PC **A02**/MF **A01**
Wisconsin Univ.-Madison.
Low-Energy Electron Diffraction Beam Shapes and Fluctuation Phenomena Near an Order-Disorder Transition.
Technical rept.,
T.-M. Lu, L.-H. Zhao, and M. G. Lagally. 14 Oct 80, 4p Rept no. TR-10
Contract N00014-76-C-0727
Pub. in Jnl. of Vacuum Science Technology, v18 n2 p504-505 Mar 81.

No abstract available.

AD-A108 221/3 PC **A02**/MF **A01**
Wisconsin Univ.-Madison.
Reconstructed Domains on a Stepped W(100) Surface.
Technical rept.,
T.-M. Lu, and G.-C. Wang. 11 Mar 80, 12p Rept no. TR-11
Contract N00014-76-C-0727
Pub. in Surface Science, v107 p139-147 1981.

No abstract available.

AD-A108 255/1 PC **A18**/MF **A01**
Research Inst. for Geodetic Sciences, Fort Belvoir, VA.
Gas-Surface Interactions in Cryogenic Whole Air Sampling.
Final rept. 1 Nov 76-31 Mar 80,
J. M. Calo, R. J. Fezza, and E. J. Dineen. May 81, 418p AFGL-TR-81-0162
Contract F19628-77-C-0071

Physico-chemical phenomena associated with in-situ cryogenic whole air sampling of stratospheric species (i.e., CF2CL2, CFCL3, N2, O2, O3, NO, NO2, N2O, and CO2) are examined. Condensation phenomena on disks of various materials, (e.g., electropolished, gold-flashed, and hexamethyldisilazane-coated stainless steel), cooled by a mechanical, helium cycle refrigerator, and subsequent thermal desorption behavior were studied using quadrupole mass spectrometry and NOx chemiluminescence. Strong, spurious 'first' condensations in the 200-250 K temperature range were observed for most of the species studied. This phenomenon is attributed to water vapor contamination of the surface, which affects both the temperature and mechanism of the subsequent 'true' thermodynamic condensation, resulting in supersaturation and condensate growth initiation by surface nucleation. Desorption spectra of binary cryofrosts and of the pure components revealed significant levels of interaction between species in the cryofrost. These results preclude chromatographic cryo-fractionation as a reliable technique for whole air sample analysis. Reactions which occur during cryofrost regeneration were studied via temperature programmed and flash desorption. Surprisingly persistent disproportionation of NO (i.e., 4NO yields N2 + 2NO2) occurred with conversions of nearly 50% upon desorption of NO- containing cryofrosts. Rapid ozone recombination and oxidation of NO to NO2 by ozone are also reported. (Author)

AD-A108 270/0 PC **A02**/MF **A01**
Army Materials and Mechanics Research Center, Watertown, MA.
Mitigation of Conductive Fiber Release by Selected Coatings.
Final rept.,
Stanley E. Wentworth, and Abram C. King. Sep 81, 14p Rept no. AMMRC-TR-81-47

Several polymeric coatings have been evaluated, by means of a technique utilizing thermogravimetric analysis and scanning electron microscopy, as to their effectiveness in preventing the release of conductive fibers from a graphite/epoxy composite subjected to a thermaloxidative environment. The coatings examined included a conventional commercial paint, a conventional Mil Spec flame-retardant paint, an experimental poly(aryloxyphosphazene)-based flame-retardant paint, and an experimental high temperature-resistant polyphenylquinoxaline (PPQ). It was concluded that the PPQ offered considerable promise for mitigating fiber release although work on formulation development is required for optimum effect. It was also concluded that the poly(aryloxyphosphazene) coated directly onto the fibers prior to their incorporation into the composite was an equally promising approach provided that the resultant degradation in mechanical properties can be circumvented.

AD-A108 292/4 PC **A04**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
The Effects of Propellant Burn on the Surface Composition of Gun Steel.
Technical rept.,
A. Niiler, R. Birkmire, and S. E. Caldwell. Nov 81, 73p Rept no. ARBRL-TR-02380

The erosion of gun barrel bore surfaces caused by high temperature, high pressure and high velocity gases is responsible for the lives of many such barrels being wear-limited. In addition, such interactions are often accompanied by significant alterations to the remaining bore surfaces. An ion beam analysis method has been used to characterize the depths and compositions of the outer, sub-micron layers of gun steel surfaces that have been exposed to variety of environments from several propellant/additive combinations. Correlations between the oxide/nitride concentrations in the surface layers, the propellant flame temperatures and erosive wear obtained. Scanning electron microscope observations of exposed surfaces were also made. The combined results indicate the presence of thermo-chemical erosion as well as erosion by a surface melt and wipe-off process.

AD-A108 329/4 PC **A03**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Dept. of Chemistry.
Quantum Chemical and Theoretical Investigations of Toxicity.
Annual technical rept. no. 1, 1 Dec 80-15 Nov 81,
Joyce J. Kaufman. 20 Nov 81, 41p
Contract N00014-81-K-0007

The ultimate desire is to formulate and implement a global approach to quantum chemical and theoretical prediction of toxicity. This is a rational and attainable goal based on our closely related experience with a wide variety of molecules with diverse biological and pharmacological effects. The objective of the present research is more closely focussed; namely, to demonstrate the feasibility of quantum chemical and other theoretical techniques in the correlation and then in the prediction of toxicity of a specific class of compounds. The family of compounds we chose were the organophosphorus pesticides and nerve gas family since these both have relatively clearcut one dose acute lethal toxicity, LD sub 50, and ED sub 50 for the triggering event, inhibition of acetylcholinesterase, to serve as well-defined end points. We expected to be able to identify particular quantum chemical requisites which are related to and predictive of the toxic effects of these molecules and our preliminary quantum chemical results on the organophosphorus compounds already show that we have been successful in this endeavor. We carried out ab-initio calculations on a number of phosphorus compounds including the two optical isomers of GB using our own rapid efficient computer programs which incorporate a number of desirable options for ab-initio calculations on large molecules including ab-initio effective core model potentials (MODPOT) which enable calculations of valence electrons only explicitly, yet accurately, and a charge conserving integral prescreening evaluation (which we named VRDDO - variable retention of diatomic differential overlap) especially effective for spatially extended molecules.

AD-A108 345/0 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Identifying and Determining Halocarbons in Water Using Headspace Gas Chromatography.
Special rept.,
Daniel C. Leggett. Oct 81, 17p Rept no. CRREL-SR-81-26

Since the discovery that chloroform and other haloforms are produced during water chlorination, methods have been needed for their routine analysis. This report describes application of the multiple equilibration headspace technique for the determination of halocarbons in water. This method has certain advantages over solvent extraction and direct injection techniques, including greater sensitivity because of the favorable gas/liquid distribution ratios. It is simpler and faster than purge and trap and resin sorption methods and gives more information about compound identity than single headspace analysis because gas/liquid distribution ratios are determined experimentally. The method is absolute, unlike solvent extraction, resin sorption, purge and trap, and conventional headspace analysis, which require standard additions to correct for incomplete recovery. The use of the technique to analyze chlorinated water samples for halo-forms revealed a potential problem in their analysis. Haloforms continued to form for 24 hours, even after destruction of chlorine residuals with thiosulfate. Maximum haloform concentrations were observed in undechlorinated samples only after a 48-hour aging period. (Author)

AD-A108 362/5 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Quantitative Chromatographic Analyses of N-Phenyl-Alpha-Naphthylamine and N-Phenyl-Beta-Naphthylamine.
Memorandum rept.,
P. J. Sniegoski. 4 Dec 81, 14p Rept no. NRL-MR-4704

Three convenient chromatographic methods were developed for the quantitative analysis of N-phenyl-beta-naphthylamine in samples of N-phenyl-alpha-naphthylamine. The TLC method makes use of dipropylene glycol impregnated silica gel plates. XE-60 is utilized in the GC method, and a column packed with NH 210 micrometers is used in the LC separation. Analyses were carried out on various commercial samples of N-phenyl-alpha-naphthylamine that were to be used as an antioxidant in aircraft engine lubricants. (Author)

AD-A108 419/3 PC **A03**/MF **A01**
College of William and Mary, Williamsburg, VA. Dept. of Physics.
A Study of the Collisional Dynamics for Collisions of UF(6)(-) with Atoms and Molecules.
Final scientific rept. 1 Jul 80-30 Jun 81,
R. L. Champion, and L. D. Doverspike. Aug 81, 26p U4, AFOSR-TR-81-0762
Grant AFOSR-80-0227

Absolute total cross sections for the collisional decomposition of the negative ion of Uranium Hexafluoride have been measured for laboratory collision energies up to 500 eV. The results have been analyzed with a statistical theory of unimolecular decomposition. By varying the temperature of the carbon surface upon which the negative ions are created, the average initial internal energy in the negative molecular ion can be selected. Experiments performed with 'hot' negative molecular ions indicate larger decomposition cross sections and lower energy thresholds when compared to results for 'cold' negative molecular ions. (Author)

AD-A108 422/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for Materials Science and Engineering.
Study of the Magnetic Phase Dependence of the Ni-CO Reaction Rate.
Final research rept. 1 Oct 76-30 Sep 81,
M. S. Dresselhaus. 13 Nov 81, 7p AFOSR-TR-81-0776
Grant AFOSR-77-3130

Our studies of the magnetic phase dependence of chemical reactions includes both an experimental and a theoretical program. We describe below progress made during the funding period of the grant in both the experimental and theoretical programs. The experimental program focused firstly on repeating previously reported observations of a strong, oscillatory magnetic field dependence of a chemical reaction, the carbonylation of Ni to form nickel carbonyl. Using a more sensitive experimental system than that of the previous workers, we were not able to repeat their reported results. The second experimental program focused on the observation of a change in reaction rate and activation energy of the chemical reaction due to a magnetic phase transition of the reacting substrate. This phenomenon was conveniently studied using nickel copper alloys to vary the Curie temperature. Cluster calculations for the energy levels showed that the addition of a single carbon monoxide group fills the d shell and leads to a diamagnetic complex. The third experimental program addressed the observation of

the Hedvall effect in a reaction where the magnetic species was purely catalytic, namely the hydrogenation of ethylene on nickel copper surfaces. The theoretical modeling was carried out with a spin polarized calculation of the energy levels of an ethylene molecule bound to a nickel cluster.

AD-A108 485/4 PC **A02**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Vapor Heat Capacities and Enthalpies of Vaporization of Six Organic Compounds.
Interim rept.,
I. A. Hossenlopp, and D. W. Scott. 7 Dec 79, 11p
AFOSR-TR-81-0754
Grant AFOSR-ISSA-80-0004
Pub. in Jnl. of Chemical Thermodynamics, v13 p405-414 1981.

No abstract available.

AD-A108 488/8 PC **A02**/MF **A01**
Oregon Univ., Eugene.
Widths and Fluorescence Yields of Atomic L-Shell Vacancy States,
Mau Hsiung Chen, Bernd Crasemann, and Hans Mark. 9 Feb 81, 7p AFOSR-TR-81-0758
Grant AFOSR-79-0026
Pub. in Physical Review A, v24 n1 p177-182 Jul 81.

No abstract available.

AD-A108 489/6 PC **A02**/MF **A01**
Florida Univ., Gainesville. Quantum Theory Project.
The Dilated Electron Propagator: A Bi-Orthogonal Approach.
Interim rept.,
Manoj Mishra, Piotr Froelich, and Yngve Oehrn. 26 Sep 80, 9p TF-582, AFOSR-TR-81-0756
Grant AFOSR-79-0032
Pub. in Chemical Physics Letters, v81 n2 p339-346, 15 Jul 81.

No abstract available.

AD-A108 490/4 PC **A02**/MF **A01**
Oregon Univ., Eugene. Dept. of Physics.
Interaction with Auger Continua as a Source of Atomic-Energy-Level-Shifts,
Mau Hsiung Chen, Bernd Crasemann, and Hans Mark. 6 Apr 81, 5p AFOSR-TR-81-0757
Grant AFOSR-79-0026
Pub. in Physical Review A, v24 n2 p1158-1161 Aug 81.

No abstract available.

AD-A108 497/9 PC **A02**/MF **A01**
Hull Univ. (England). Dept. of Chemistry.
Decomposition of 2,2,3-Trimethylbutane in the Presence of Oxygen.
Interim rept.,
Roy R. Baldwin, Raymond W. Walker, and Robert W. Walker. 24 May 79, 15p AFOSR-TR-81-0752
Grant AFOSR-77-3215
Pub. in J.C.S. Faraday I, v76 p825-837 1980.

No abstract available.

AD-A108 506/7 PC **A02**/MF **A01**
New Hampshire Univ., Durham. Dept. of Physics.
Alkaline Earth-Noble Gas Excimers.
Final technical rept. 1 Mar 79-31 Aug 81,
John J. Wright. 31 Aug 81, 13p AFOSR-TR-81-0774
Contract F49620-79-C-0049

This project was undertaken to investigate the interaction between alkaline earth atoms in the triplet state and noble gas atoms. A major effort was devoted to producing large triplet state populations via laser excitation of the singlet state and collisional transfer to the triplet state. Cross sections for this process were measured using a new technique developed in this laboratory. These cross sections were much larger than expected, probably due to molecular curve crossings with intermediate states. The results predicted a population inversion in strontium was possible and an attempt was made to produce a strontium laser. Because of low laser pump power, an inversion of only fifty percent was achieved where as lasing threshold required ninety percent. Attempts to observe far wing emission from calcium and strontium interactions with noble gases at high temperatures failed because of the thermal energies involved and because of blackbody radiation. A technique was developed to do laser spectroscopy at low temperatures in a sealed cell containing metal atom vapors and high pressure noble gases. The technique was tested by measuring, for the first time, the excited state potential of the sodium-helium excimer molecule. This difficult experiment was made possible by state-of-the art laser spectroscopy and the low temperature technique, which enhanced the excimer emission by orders of magnitude. (Author)

AD-A108 520/8 PC **A04**/MF **A01**
Johns Hopkins Univ., Baltimore, MD.
Quantum Chemical Investigations of the Mechanism of Cationic Polymerization and Theoretical Prediction of Crystal Densities and Decomposition Pathways of Energetic Molecules.
Annual summary rept. 1 Oct 80-30 Sep 81,
Joyce J. Kaufman. 15 Oct 81, 61p Rept no. TR-2
Contract N00014-80-C-0003

Contents: Ab-initio quantum chemical investigations of the mechanism of cationic polymerization; Development of theoretical procedures for prediction of crystal structures and densities; Ab-initio quantum chemical MODPOT/VRDDO/MERGE calculations on nitro-explosives; and Decomposition pathways of energetic compounds.

AD-A108 539/8 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. Chemical and Biodegradation Processes Group.
The use of Element-Specific Detectors Coupled with High-Performance Liquid Chromatographs.
Interim technical rept.,
K. L. Jewett, and F. E. Brinckman. 4 Nov 81, 47p
Contract N00014-81-F-0013

Element-specific detectors (ESDs) provide an excellent means of determining the molecular character and elemental composition of complex column effluents, when used in tandem with HPLC systems. General purpose flame and electrothermal AA units along with inductively coupled and direct current plasma detectors are discussed in terms of the inherent advantages, difficulties and detection limits associated with using such systems. Other, more limited ESDs, such as flame photometric detectors are also compared. The HPLC-ESD interface remains the largest hurdle to increased utilization of this new analytical probe and attempts to solve or minimize this problem are reviewed. Recent applications involving HPLC-ESD systems illustrate the important role that these detectors can and will play in solving a wide variety of specification problems with biological, environmental, and energy-related matrices. Over 100 literature citations are provided. (Author)

AD-A108 541/4 PC **A02**/MF **A01**
New York Univ., NY. Dept. of Physics.
Theoretical Investigation of Atomic Structure and Scattering Processes.
Summary questionaire rept. Mar 81-Feb 82,
Larry Spruch, and Leonard Rosenberg. Nov 81, 5p
Contract N00014-76-C-0317

The theory of electron-atom scattering in a laser field has been studied and approximation methods applicable to low frequency laser fields have been developed. A study has been made of the dependence of the binding energy of heavy atoms on the atomic number. This is useful in developing generalizations to Thomas-Fermi theory. (Author)

AD-A108 549/7 PC **A04**/MF **A01**
IBM Research Lab., San Jose, CA.
Laser Hole Burning Spectroscopy: A High Resolution Probe of Molecular Environments.
Final rept. 1 Jun 79-1 Jun 81,
R. M. Macfarlane, and R. M. Shelby. 1 Jun 81, 57p
AFOSR-TR-81-0790
Contract F49620-79-C-0108

Laser induced hole burning in optical absorption bands of low temperature solids has been investigated with emphasis on mechanisms for population hole burning, the interactions with the environment which limit the hole widths and the use of hole burning for ultra high resolution spectroscopy. Hole burning was observed in a wide range of solids including organic and organometallic molecules in crystals and rare earth ions in crystals and glasses. The mechanisms for hole burning also varied widely and a new mechanism involving optically induced nuclear spin flips of near neighbor nuclei was discovered. Examples of hole burning in new classes of materials are presented here for the first time, namely inorganic glasses (silicate glasses containing Nd(3+), Pr(3+) or Eu(3+)) and undoped stoichiometric compounds (e.g., EuP5O14). Hole recovery was used to determine nuclear spin lattice relaxation rates in praseodymium doped crystals. For allowed optical transitions (e.g., singlet states of zinc porphyrin, dibromoindigo and color centers in alkali halides) the hole widths at 2K are limited by population decay to approximately 50 MHz. For longer lived optical levels in crystalline materials, e.g., those containing rare earth ions, the hole widths are narrower (less than 10 MHz) and are limited by dynamical interactions with surrounding nuclei. In amorphous materials such as europium doped silicate glass, hole widths are much broader, being limited by low frequency tunneling motions. Hole burning measurements were complemented by time domain coherent transient (photon echo, and optical free decay) measurements of homogeneous linewidths which enabled us to measure optical resonances as narrow as 760 Hz in Eu(3+):Y2O3.

AD-A108 567/9 PC **A03**/MF **A01**
State Univ. of New York at Buffalo. Dept. of Chemistry.
Chronoamperometric Transients at the Stationary Disk Microelectrode.
Technical rept.,
Tadeusz Hepel, and Janet Osteryoung. 30 Nov 81, 37p Rept no. TR-7
Contract N00014-79-C-0682

Chronoamperometric transients for diffusion controlled reactions at stationary platinum and gold microelectrodes have been examined. The results are compared with those predicted theoretically for hemispherical electrodes and for disk electrodes. The hemispherical model was found to describe the current-time transients only qualitatively, while excellent agreement was obtained between the theory for a stationary disk and data for the hexacyanoferrate (II)/(III) redox reaction. Equations for mass transport to a stationary disk electrode derived earlier form the basis for graphical methods of analysis of a single current-time transient which permit the simultaneous determination of two of the three parameters electrode radius, diffusion coefficient, and concentration. A plot of I vs 1/sq. rt. t has the advantage of simplicity. A logarithmetic analysis (log I-log t) requires data over a greater time range but offers advantages in characterizing electrode geometry. The effects of surface irregularities and electrode sphericity are also discussed. (Author)

AD-A108 572/9 PC **A03**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
Theoretical and Empirical Equations of State for Nitrogen Gas at High Pressure and Temperature.
Technical rept. 1977-1980,
Theodore Vladimiroff. Sep 81, 41p ARLCD-TR-81029, SBI-AD-E400 697

Equations of state for nitrogen gas are investigated using both empirical and theoretical techniques. It was found that none of the empirical equations are accurate, thus seriously impairing the predictive capacity of current interior ballistic computer programs. Theoretical calculations which use a Lennard-Jones intermolecular potential in conjunction with the Percus-Yevic equation or the Varlet-Weis perturbation theory seem to be more accurate although the simple Lennard-Jones potential is not completely satisfactory. More realistic results should be obtainable by use of the Maitland and Smith potential which allows more accurate pressure calculations for nitrogen as well as other propellant gases.

AD-A108 595/0 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Inhibited Spontaneous Emission,
Daniel Kleppner. 28 Apr 81, 6p
Contract N00014-79-C-0183
Pub. in Physical Review Letters, v47 n4 p233-236, 27 Jul 81.

No abstract available.

AD-A108 601/6 PC **A04**/MF **A01**
Physical Sciences, Inc., Woburn, MA.
High Temperature in Absorption Measurements.
Final rept. 15 Aug 80-30 Jun 81,
Robert H. Krech, and Evan R. Pugh. Sep 81, 64p
PSI-TR-279, AFRPL-TR-81-79
Contract F04611-80-C-0042

The objective of this study was to measure the temperature dependence of the absorption coefficient of water vapor to determine the feasibility of using water vapor as a molecular seed to couple 10.6 micrometer CO2 laser radiation into a propellent for use in a high performance laser heated rocket thruster. A series of shock tube experiments were performed to determine the temperature dependence of the absorption coefficient of water vapor at high temperatures on the P(16), P(18) and P(20) 10.6 micrometer CO2 laser transitions. Measurements were made behind both incident and reflected shock waves encompassing a temperature range from 600 K to 3700 K at pressures from 1 to 40 atmospheres in 2, 5, and 10 mole percent water vapor in argon gas mixtures; a limited number of measurements were also made using 10 mole percent mixtures of water vapor in hydrogen or nitrogen. Conditions at several temperatures were sufficiently varied to investigate the effects of broadening on the absorption coefficient. Within the narrow spectral range from 944 to 948 cm covered in the measurements, no significant variation in the absorption coefficient was observed as a function of laser wavelength, water concentration, total pressure, or collision partner. These observations suggest that the water lines are sufficiently broadened to act as a continuum absorber under conditions to be found in a laser-heated rocket thruster. The measured laser high temperature absorption coefficients are 50% lower than the values obtained from the Ludwig empirical curve fit to low resolution data.

AD-A108 630/5 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Electron Transmission through and Reflection by an Arbitrary Set of Square Potential Steps.
Memorandum rept.,
F. L. Carter. 7 Dec 81, 13p Rept no. NRL-MR-4680

An exact analytic solution has been derived for the transmission of electrons through a series of up to six square potential steps. From these an algorithm is derived which readily gives the solution for any arbitrary number of square potential steps. (Author)

AD-A108 662/8 Not available NTIS
Stanford Univ., CA. Dept. of Electrical Engineering.
The Nature of the 7 x 7 Reconstruction of Si(111): as Revealed by Changes in Oxygen Sorption from 2 x 1 to 7 x 7,
C. Y. Su, P. R. Skeath, I. Lindau, and W. E. Spicer. 9 Feb 81, 7p
Contract DAAK02-74-C-0069
Availability: Pub. in Surface Science, v107 pL355-L361 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A108 663/6 Not available NTIS
Stanford Univ., CA. Dept. of Electrical Engineering.
Use of Photoemission with Synchrotron Radiation to Probe Surfaces on an Atomic Scale,
W. E. Spicer. 1981, 19p
Contracts N00014-75-C-0289, N00014-79-C-0072
Availability: Pub. in Surfaces and Interfaces in Ceramic and Ceramic-Metal Systems, p51-69 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A108 664/4 Not available NTIS
Stanford Univ., CA. Dept. of Electrical Engineering.
Possible Oxygen Chemisorption Configurations on the Si(111) 2x1 Surface,
C. Y. Su, Perry Skeath, I. Lindau, and W. E. Spicer. 17 Mar 81, 6p
Contracts N00014-75-C-0289, N00014-79-C-0072
Availability: Pub. in Jnl. of Vacuum Science and Technology, v19 n3 p481-486 Sep/Oct 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A108 667/7 Not available NTIS
Stanford Univ., CA. Dept. of Electrical Engineering.
Oxidation of Si(111), 7x7 and 2x1: A Comparison,
C. Y. Su, P. R. Skeath, I. Lindau, and W. E. Spicer. 7 Oct 80, 4p
Contracts N00014-79-C-0072, N00014-75-C-0289
Availability: Pub. in Jnl. of Vacuum Science and Technology, v18 n3 p843-846 Apr 81 (No copies furnished by DTIC/NTIS).

No abstract available.

MLM-2751 PC **A04**/MF **A01**
Mound Facility, Miamisburg, OH.
Surface Studies on the Thermite Mixture of Al/Cu sub 2 O. I. Auger and X-Ray Photoelectron Results Using Si K/sub alpha /X-Radiation.
A. Rengan, L. D. Haws, W. E. Moddeman, and P. S. Wang. 7 Oct 80, 53p
Contract AC04-76DP00053

Thermite is the name given to a mixture of powdered aluminum and a metallic oxide. When a thermite mixture is ignited the chemical reaction proceeds very rapidly with a great evolution of heat, the temperature rising to around 2000 exp 0 C. Uses for the thermite reaction have been found in metallurgy, in immobilizing radionuclides, and in military applications. The surface chemistry of the thermite materials, aluminum and copper powders, were examined with Auger and x-ray photoelectron spectroscopy also referred to as Electron Spectroscopy for Chemical Analysis (ESCA). This preliminary study was made to show the feasibility of ESCA in examining the surface chemistry of the thermite materials. The surface of the aluminum metal powder was found to be contaminated with an oxide. The oxide was characterized to be Al sub 2 O sub 3 , and the oxide layer was found to be approximately 20A. A zinc contamination layer, approximately 300A thick, was noted on the copper. The oxidized species on the copper powder was characterized to be Cu(OH) sub 2 . The change in the binding energies and differences in the Auger parameter for aluminum and its oxide and copper and its oxides were substantial, making the ESCA technique useful in studying the Al/Cu sub 2 O thermite. (ERA citation 05:038417)

MLM-2753 PC **A03**/MF **A01**
Mound Facility, Miamisburg, OH.
Surface Studies on the Thermite Mixture of Al/Cu sub 2 O. III. Scanning Auger Microscopy of the Consolidated Pellet.
P. S. Wang, L. D. Haws, and W. E. Moddeman. 14 Oct 80, 26p
Contract AC04-76-DP00053

The outer and the fractured surfaces of hot-pressed Al/Cu sub 2 O pellets were investigated by scanning Auger microscopy. The surface grain images and elemental pictures of aluminum and copper are illustrated. Auger spectra of the outer surface show the existence of carbon, chlorine, oxygen, and sodium as contaminants. Auger mapping of the grains gives a clear picture of the Cu sub 2 O particles and the general continuum of the aluminum. These pictures compare well with scanning electron micrographs taken previously of similar Al/Cu sub 2 O pellets. In-depth elemental profiling, by sputter-etching, illustrates that carbon, sodium, and chlorine are surface contaminants. The analysis of the fractured surface verified the presence of an interfacial region between the aluminum and Cu sub 2 O of at least 100 A that was caused by the pelletization process at elevated temperatures. (ERA citation 05:038419)

N82-13170/7 PC **A03**/MF **A01**
National Research Council of Canada, Ottawa (Ontario). Inst. for Scientific and Technical Information.
Constitution of Silicate Anions in Tetraethyl-Ammonium Silicates and Their Aqueous Solutions.
D. Hoebbel. 1981, 26p NRC/CNR-TT-2004
Transl. Into English from Z. Anorg. Allg. Chem. (East Germany), No. 465, 1980 p 15-33.

Studies aided by paper chromatography, Si-29 NMR, and trimethylsilylation methods show that in concentrated tetraethyl ammonium silicate solutions with molar TEA:Si ratios of 2.8 to 1, for the most part double three-ring silicate anions are present, along with small concentrations of mono-, di-, tri-, tetra-, cyclotri-, cyclotetra-, double four-ring, and other polycyclic silicate anions. At low temperatures a double three-ring silicate with the formula N(C2H5)46 Si6O15.57H2O crystallizes out. Concentrated solutions with TEA:Si = 0.8 to 0.6 contain predominantly double three-, double four-, and probably also double six-ring silicate anions. From these solutions the TEA-double four-ring silicate always crystallizes out. The possible reasons for the preferential formation of double-ring silicate anions in TEA-silicate solutions and their crystallization are discussed.

ORNL/TM-6706 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Mathematical Model for Multicomponent Separations on the Continuous Annular Chromatograph.
R. L. Bratzler, and J. M. Begovich. Dec 80, 83p
Contract W-7405-ENG-26

A model for multicomponent separations on ion exchange columns has been adapted for use in studying the performance of the continuous annular chromatograph. The model accurately predicts solute peak positions in the column effluent and qualitatively predicts trends in solute effluent resolution as a function of increasing bandwidth of the solute feed pulse. The major virtues of the model are its simplicity in terms of the calculations involved and the fact that it incorporates the nonlinear solute-resin binding isotherms common in many ion exchange separations. Because dispersion effects are not accounted for in the model, discrepancies exist between the shapes of the effluent peaks predicted by the model and those determined experimentally. (ERA citation 06:005116)

ORNL/TM-6738 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Computer Simulation of Displacement Cation Exchange Chromatography: Separation of Trivalent Actinides and Lanthanides.
C. W. Forsberg. May 80, 84p
Contract W-7405-ENG-26

A first-generation mathematical model of displacement cation exchange chromatography (CES) was constructed. The model incorporated the following phenomena: diffusion of cations up and down the column, diffusion of cations from the bulk liquid to the resin surface, and equilibrium of cations between liquid and solid resin beads. A limited number of experiments with rare earths using DTPA as the separation agent were undertaken to increase the current understanding of the processes involved in cation exchange chromatography. The numerical computer program based on the mathematical model was written in FORTRAN IV for use on the IBM 360 series of computers. (ERA citation 05:026190)

ORNL/TM-7359 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Feasibility Study for the Oxidation of Am(III) By Photolysis.
H. A. Friedman. Dec 80, 20p
Contract W-7405-ENG-26

The results of a literature survey indicate that Am(III) may be light sensitive because it is characteristically similar to neptunium and plutonium. The redox potentials of americium are greater than the other two elements (which will probably make it more difficult to photolyze), and it does not absorb appreciable uv above 240 nm. A lamp whose emission is in the far uv region, a Suprasil quartz spectrophotometric-photolysis cell, and possibly an inert-atmosphere containment jacket would be needed to photolyze Am(III) in the glove box. (ERA citation 06:005154)

PATENT-4 285 918 Not available NTIS
Department of the Navy, Washington, DC.
Regenerative CO2 Absorbent.
Patent,
Paul R. Gustafson. Filed 25 Feb 80, patented 25 Aug 81, 3p AD-D009 025/8, PAT-APPL-6-124 204
Supersedes PAT-APPL-6-124 204, AD-D007 047.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Acid gases, such as CO2, can be extracted from a gaseous feed stream by contacting the exhausted inlet gas with an aqueous solution of 3-amino-1,2 propanediol, separating the regenerated feed stream from the aqueous amine solution and the acid gases dissolved therein, and further separating these dissolved acid constituents from the diol solution; finally, repeating the above cycle indefinitely. (Author)

PATENT-4 293 220 Not available NTIS
Department of the Navy, Washington, DC.
Application of Inductively Coupled Plasma Emission Spectrometry to the Elemental Analysis of Organic Compounds and to the Determination of the Empirical Formulas for These and Other Compounds.
Patent,
Medona B. Denton, and David L. Windsor. Filed 2 Jul 79, patented 6 Oct 81, 13p AD-D009 021/7, PAT-APPL-6-053 664
Supersedes PAT-APPL-6-053 664, AD-D006 670.

Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An inductively coupled plasma torch (ICP) provides an efficient means for thermally degrading many organic molecules and exciting the resulting atomic species into optical emission. Spectrometric analysis produces reliable data for qualitative and quantitative simultaneous, multi-element analyses. To determine the empirical formula of a molecular compound, a gas chronometer is used to separate a mixture and atomic emission monitored continuously by a multi-channel spectrometer over the period of time required for the rise and fall of the elution. The plural channels provide parallel outputs defining intensity relationships or ratios of the excited elements. Instantaneous sampling repetitively made during the elution period provides a large number of discrete ratios that are averaged to provide the desired empirical formula. Molecular formulas then are derivable. (Author)

PATENT-4 293 522 Not available NTIS
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Electrophotolysis Oxidation System for Measurement of Organic Concentration in Water.
Patent,
H. E. Winkler. Filed 21 May 79, patented 6 Oct 81, 9p N82-12166/6, PAT-APPL-6-041 145
Supersedes PAT-APPL-6-041 145, N79-23167 (17 - 14, p 1818).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Methods and apparatus for determining organic carbon in aqueous solution are described. The method comprises subjecting the aqueous solution to electrolysis, for generating oxygen from water, and simultaneously to ultraviolet radiation, for oxidation of substantially all organic carbon to carbon dioxide. The carbon dioxide is measured and the value is related to the concentration of organic carbon in the aqueous solution.

PB82-141797 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC.
Octanol/Water Partition Coefficients and Aqueous Solubilities of Organic Compounds,
Stanley P. Wasik, Yadu B. Tewari, Michele M. Miller, and Daniel E. Matire. Dec 81, 68p NBSIR-81-2406

A generator column method for measuring the octanol/water partition coefficient, K(o/w) and the aqueous solubility, C sup w sub s, is described. When water is pumped through a generator column packed with solid support coated with an organic stationary phase, an aqueous solution is generated that is in equilibrium with the stationary phase. The solute concentration in the eluted aqueous phase was measured either by high pressure liquid chromatography or by solvent extraction followed by gas chromatographic analysis. Aqueous solubilities and octanol/water partition coefficients of organic solutes, falling into 7 general chemical classes, have been systematically determined using the modified generator column method. From thermodynamics an equation is derived relating K(o/w) to the volume-fraction-based solute activity coefficient in water gamma sup w sub s, the latter being determinable from C sup w sub s. For each class of compounds, excellent linear correlations are found between log K(o/w) and log gamma sup w sub s with slopes close to the theoretical value of unity.

PB82-142704 PC **A02**/MF **A01**
Analytical Research Labs., Inc., Monrovia, CA.
Final Report on NIOSH Contract CDC-99-74-100,
R. R. Jay. Nov 76, 12p
Contract PHS-CDC-99-74-100

The support of Analytical Research Laboratories to NIOSH in performing organic chemical analyses for the NIOSH in-house analytical group is summarized in a final report. The major work was gas-chromatographic analyses of personal sampler sorbent tubes (usually charcoal) exposed to various noxious organic vapors. Some bulk materials were also submitted for analysis. A total of 16 individual jobs was requested. From these, a total of 1279 solvents, anesthetics and one resin were analyzed. Typical jobs included monitoring and sampling the air in a specified workplace with subsequent GC analysis. Quality control of analytical data has been maintained throughout the project by a three phase program. Problems in statistical analysis of quality control data are noted.

PB82-145285 PC **A04**/MF **A01**
Central Inst. for Industrial Research, Oslo (Norway).
Polycyclic Aromatic Hydrocarbons in Water. Part I: Evaluation of Existing Analytical Methods. Recovery Studies.
Rept. no. 4,
Bjoern Olufsen, and Georg E. Carlberg. Dec 79, 68p

The report describes recovery studies for different methods for the analysis of polynuclear aromatic hydrocarbons (PNA) in water. Direct liquid/liquid extraction of water and adsorption of PNA to a polymeric material have been tried. Different solvents have been tried in the elution (extraction) of the polymer as well as experiments both with gravimetric elution and continuous extraction. The result is a method which is applicable to any kind of water sample and which is based on absorption to an organic polymer. Practical details of the analytical procedure is given in a separate report, part II (Nordic PAH-project Report No. 5). The apparatus in use is a modified Soxhlet apparatus for the cleaning of the resin, adsorption of organics from water and continuous extraction without drying of the resin, and regeneration of the resin. The extract is further cleaned by liquid/liquid extractions and the components are finally separated by high resolution gas chromatography on glass capillary columns. Several samples of Norwegian drinking water have been analyzed indicating a level of tar compounds which is well below the standard recommended by The World Health Organization.

PB82-145632 PC **A08**/MF **A01**
Indian Council of Chemists, Agra.
Indian Council of Chemists First Annual Conference. Abstracts.
1981, 157p

No abstract available.

PB82-145848 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
The Preparation and Certification of Six Reference Materials for Zn in Zn Ore Concentrates (BCR RMs No. 26, 27, 28, 29, 30 and 31),
G. Rossi, L. Haemers, and J. Van Audenhove.
c1981, 34p EUR-7130-EN
Abstract in French and English.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The aims and the experimental procedures for the certification of Zn content in six zinc ore concentrate samples are described. The technical evaluation of the analytical methods employed by 12 cooperating laboratories and the statistical approach by which Zn certified values and associated uncertainties were drawn from the analytical data are presented. (Copyright (c) ECSC-EEC-EAEC, Brussels-Luxembourg.)

PB82-147737 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
Reference Materials for Hg, Pb, Mg, Fe, Cd, Cu and F in Zn Ore Concentrate Samples (BCR RMs No. 108, 109 and 110),
G. Rossi, and L. Haemers. c1981, 47p EUR-7131-EN
Abstract in French and English.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The aims and the experimental procedures which led to the certification of the contents of Hg, Pb, Mg, Fe, Cd, Cu and F of three Zn ore concentrate samples are described. The analytical data obtained by 12 cooperating laboratories and the statistical approach employed to derive the certified content values and associated uncertainties from these data are presented. (Copyright (c) ECSC-EEC-EAEC, Brussels-Luxembourg.)

PB82-147745 PC **E02**/MF **E02**
Commission of the European Communities, Luxembourg.
Water Determination in Presence of Iron Chlorides: Critical Examination of Various Methods (Determinazione dell'acqua nei Cloruri di Ferro: Esame Critico dei Vari Metodi),
G. Serrini, and G. Serrini-Lanza. c1981, 18p EUR-7166-IT
Text in Italian.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The determination of water in the presence of various types of ion chlorides or mixtures of these chlorides with various iron oxides, using Karl Fischer titration, is reported. In the case of the direct titration, Fe (III) interferes with Karl Fischer reagent. A preliminary separation of the water by azeotropic distillation (water-chloroform) allows the determination of water without any interference. This separation method can be applied to other products for which the determination of water by direct Karl Fischer titration is not applicable. (Copyright (c) ECSC-EEC-EAEC, Brussels-Luxembourg.)

PB82-147828 PC **A03**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Materials Science.
A National Facility for the Study of Heterogeneous Catalysis, Workshop Held at Northwestern University, Evanston, Illinois on May 8-9, 1981,
J. B. Butt, and L. H. Schwartz. 1981, 40p NSF/CPE-81020
Grant NSF-CPE80-24102

The need for expanded research in the field of heterogeneous catalysis, which contributes directly or indirectly to products accounting for at least one-sixth of all the goods manufactured in the United States, was stressed. Three principal needs were addressed: (1) the difficulty in obtaining funds for acquisition of valuable analytical techniques which have become critical in catalysts studies; (2) the desirability of increasing the number of trained scientists in the field; and (3) the need to organize the effort in a manner consistent with the needs of the field in the United States. A proposal for a national program in heterogeneous catalysis was presented. It suggests that several centers be funded to deal with both equipment needs and educational aspects of the field, and that these centers be attached to educational institutions. Selection of the centers would be made via evaluation of competitive proposals and location of the centers would be based on demonstrated capabilities and planned research programs.

PB82-153461 PC **A03**/MF **A01**
Catalytic, Inc., Philadelphia, PA.
The Impact of R and D in the Area of Catalysis on the Development of Thermochemical Cycles.
Final rept. Jun 79-Nov 80,
John Happel, Miguel A. Hnatow, and Liamonis Bajars. Jan 80, 26p GRI-80/0024
Contract GRI-5014-323-0190

A study was performed to assess the impact of additional research and development in the area of catalysis as applied to thermochemical cycles for hydrogen production. All of the most advanced cycles involve one or more reaction steps which require catalysts. This study shows that the economics could be improved considerably for these systems by further catalyst improvement.

PB82-153511 PC **A03**/MF **A01**
General Electric Co., Wilmington, MA. Direct Energy Conversion Programs.
Solid Polymer Electrolyte Water Electrolysis Technology Development for Large-Scale Hydrogen Production (Design Phase).
Final rept. Mar 79-Dec 80,
J. H. Russell, P. J. Chludzinski, D. K. Gupta, G. A. Smarz, and J. M. Sedlak. Jan 81, 32p GRI-80/0097
Contract GRI-5011-323-0143

This Final Report covers the GRI-sponsored effort during 1979 and 1980 toward development of large-scale water electrolyzers utilizing solid polymer electrolyte technology. In 1979, this effort was aimed at design of a 10 sq ft (active area) cell and module. During 1980 the effort encompassed front end manufacturing development of the 10 sq ft cell. This effort was part of a joint development program. Other sponsors included the U.S. Department of Energy, the Niagara Mohawk Power Corporation, the Empire State Electric Energy Research Corporation, and the General Elctric Company. The 10 sq ft cell is a scale-up of

the 2.5 sq ft cell developed under the joint program. The design utilizes molded carbon current collectors and pneumatically-loaded compression techniques.

PB82-155979 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Organochlorine Pesticides in Industrial and Municipal Wastewater: Method 608.1.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 23p EPA-600/4-82-003

This is a gas chromatographic (GC) method applicable to the determination of selected pesticides in municipal and industrial dischargers as provided under 40CFR 136.1. A sample is solvent extracted with methylene chloride using a separatory funnel. The extract is exchanged to hexane during concentration. GC conditions are described which permit measurement with an electron capture detector. The compounds included in the method scope are: chlorobenzilate, chloroneb, chloropropylate, dibromochloropropane, etridiazole, PCNB, and propachlor.

PB82-155987 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Organophosphorus Pesticides in Industrial and Municipal Wastewater: Method 614.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 24p EPA-600/4-82-004

This is a gas chromatographic (GC) method applicable to the determination of selected pesticides in municipal and industrial discharges as provided under 40CFR 136.1. A sample is solvent extracted with 15% methylene chloride in hexane using a separatory funnel. The extract is concentrated, then analyzed by GC with a flame photometric or phosphorus/nitrogen detector. The compounds included in the method scope are: azinphos methyl, demeton, diazinon, dichlorofenthion, dioxathion, disulfoton, ethion, malathion, parathion ethyl, and parathion methyl.

PB82-155995 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Chlorinated Herbicides in Industrial and Municipal Wastewater: Method 615.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 24p EPA-600/4-82-005

This is a gas chromatographic (GC) method applicable to the determination of selected pesticides in municipal and industrial discharges as provided under 40CFR 136.1. An acidified sample is solvent extracted with ethyl ether using a separatory funnel. Esters of the acids are hydrolyzed to the free acid. The acids are esterified with diazomethane and determined by GC using an electron capture or halide detector. The compounds included in the method scope are the salts, esters, or acids of 2,4-D; 2,4-DB; 2,4,5-T; 2,4,5-TP; dalapon; dicamba; dichloroprop; dinoseb; MCPA; and MCPP.

PB82-156001 PC **A03**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Organohalide Pesticides and PCBs in Industrial and Municipal Wastewater: Method 617.
Final rept.,
Thomas A Pressley, and James E. Longbottom. Jan 82, 35p EPA-600/4-82-006

This is a gas chromatographic (GC) method applicable to the determination of selected pesticides in municipal and industrial discharges as provided under 40CFR 136.1. A sample is solvent extracted with 15% methylene chloride in hexane using a separatory funnel. The extract is concentrated, then analyzed by GC with an electron capture detector. A total of 29 pesticides and 7 PCBs are included in the method scope.

PB82-156019 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Triazine Pesticides in Industrial and Municipal Wastewater: Method 619.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 23p EPA-600/4-82-007

This is a gas chromatographic (GC) method applicable to the determination of selected pesticides in municipal and industrial discharges as provided under 40CFR 136.1. A sample is solvent extracted with methylene chloride using a separatory funnel. The extract is concentrated and analyzed by GC using a nitrogen/phosphorus or reductive electrolytic conductivity detector. The compounds included in the method scope are: ametryn, atraton, atrazine, prometon, prometryne, propazine, secbumeton, simazine, terbuthylazine, and terbutryn.

PB82-156027 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Organophosphorus Pesticides in Industrial and Municipal Wastewater: Method 622.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 25p EPA-600/4-82-008

This is a gas chromatographic (GC) method applicable to the determination of selected pesticides in municipal and industrial discharges as provided under 40CFR 136.1. A sample is solvent extracted with methylene chloride using a separatory funnel. The extract is concentrated and analyzed by GC using a flame photometric or phosphorus/nitrogen detector. The compounds included in the method scope are: azinphos methyl, bolstar, chlorpyrifos, coumaphos, demeton, diazinon, dichlorvos, disulfoton, ethoprop, fensulfothion, fenthion, merphos, mevinphos, naled, parathion methyl, phorate, ronnel, stirophos, tokuthion, and trichloronate.

PB82-156035 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Dinitroaniline Pesticides in Industrial and Municipal Wastewater: Method 627.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 21p EPA-600/4-82-009

This is a gas chromatographic (GC) method applicable to the determination of selected pesticides in municipal and industrial discharges as provided under 40CFR 136.1. A sample is solvent extracted with methylene chloride using a separatory funnel. The extract is exchanged to hexane during concentration. GC conditions are described which permit measurement with an electron capture detector. The compounds included in the method scope are: benfluralin; ethalfluralin; isopropalin; profluralin; and trifluralin.

PB82-156043 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Cyanazine in Industrial and Municipal Wastewater: Method 629.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 20p EPA-600/4-82-010

This is a high performance liquid chromatographic (HPLC) method applicable to the determination of cyanazine in municipal and industrial discharges as provided under 40CFR 136.1. A sample is solvent extracted with methylene chloride using a separatory funnel. The extract is exchanged to methanol during concentration. HPLC conditions are described which permit measurement with an ultraviolet detector.

PB82-156050 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Dithiocarbamate Pesticides in Industrial and Municipal Wastewaters: Method 630.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 15p EPA-600/4-82-011

This is a colorimetric method applicable to the determination of selected pesticides in municipal and industrial discharges as provided under 40CFR 136.1. A sample is digested with acid to yield carbon disulfide by hydrolysis of dithiocarbamates. The evolved CS2 is trapped in a color reagent and absorbance is measured at 380 and 435 nm. The compounds included in the method scope are: amobam, Busan 40, Busan 85, ferbam, KN methyl, mancozeb, maneb, metham, nabam, niacide, polyram, sodium dimethyldithiocarbamate, thiram, zineb, and ziram.

PB82-156068 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Benomyl and Carbendazim in Industrial and Municipal Wastewater: Method 631.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 19p EPA-600/4-82-012

This is a high performance liquid chromatographic (HPLC) method applicable to the determination of carbendazim and benomyl in municipal and industrial discharges as provided under 40CFR 136.1. A sample is acidified to hydrolyze benomyl to carbendazim. The total carbendazim is extracted with methylene chloride using a separatory funnel. The extract is exchanged to methanol during concentration. HPLC conditions are described which permit measurement with an ultraviolet detector.

PB82-156076 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Organonitrogen Pesticides in Industrial and Municipal Wastewater: Method 633.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 20p EPA-600/4-82-013

This is a gas chromatographic (GC) method applicable to the determination of selected pesticides in municipal and industrial discharges as provided under 40CFR 136.1. A sample is solvent extracted with methylene chloride using a separatory funnel. The extract is concentrated, then analyzed by GC with a nitrogen-specific detector. The compounds included in the method scope are: bromacil, deet, hexazinone, metribuzin, terbacil, triadimefon, and tricyclazole.

PB82-156084 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
The Determination of Carbamate and Urea Pesticides in Industrial and Municipal Wastewater: Method 632.
Final rept.,
Thomas A. Pressley, and James E. Longbottom. Feb 82, 22p EPA-600/4-82-014

This is a high performance liquid chromatographic (HPLC) method applicable to the determination of selected pesticides in municipal and industrial discharges as provided under 40CFR 136.1. A sample is solvent extracted with methylene chloride using a separatory funnel. The extract is exchanged to methanol or acetonitrile during concentration. HPLC conditions are described which permit measurement with an ultraviolet detector. A total of 21 pesticides are included in the method scope.

RFP-2909 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Quality Engineering and Control. Semiannual Progress Report, November-December 1978, January-April 1979.
R. L. Carpenter. 2 Aug 80, 38p
Contract AC04-76DP03533

This document reports the following: atomic absorption spectroscopy of Ir in Pu-Ir alloys; removal of Pu from soil; surface microanalysis using elemental x-ray mapping; microscopic scanning of Ga in Pu; microscopy of defects in Pu; emission spectroscopy of Ir and Y in PuO sub 2 ; gas chromatograhy of PCB's in transformer oils and water; liquid chromatography of chlorophenoxy acid herbicides in water; solution analysis by spark source mass spectrometry; a portable gas sampling system; flammability testing of HEPA filter materials; identification of Nomex and Kapton in fiberglass filters; bromine in Be density problem; x-ray fluorescence of Nb in U-Nb alloys; reactions in Pu-nitric acid-ethylene glycol; gas-fusion analysis of oxygen in chromium; analysis of sulfate and chloride in water-soluble oils; and decontamination of surface coatings. (ERA citation 05:032632)

RFP-3015 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Quality Engineering and Control. Semiannual Progress Report, May-October 1979.
R. L. Carpenter. 19 Aug 80, 34p
Contract AC04-76DP03533

The following are reported: colorimetric determination of Ti in Cr, decontamination of metals by anodic dissolution, computer code for x-ray peak identification, gel-permeation chromatography of CoRezyn 1664 polyester resin, infrared monitoring of gases and vapors, particle size analysis of dusts, nondestructive analysis of Oralloy for removable alpha contamination, dissolution (digestion) of high-fired oxides, assay of U in a Pu-U alloy, measurement of oxide thickness on Pu metal by x-ray diffraction, analysis of precipitated Pu peroxide, differentiation of Dowex SBR and 11 resins, and determination of Pu solubility in simulated lung fluid. (ERA citation 05:032633)

SAND-80-1740 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Velocity Relaxation Phenomena Associated with Bennett Holes in a Lorentz Gas.
M. E. Riley. Sep 80, 32p
Contract AC04-76DP00789

Because of the ability of a nearly monochromatic beam of light to couple with a specific velocity group of atoms or molecules in the gas phase via the Doppler effect, there exists a potential application of lasers to the investigation of certain collisional phenomena which are usually reserved for atomic or molecular beam experiments. This report develops and discusses the theory required for the analysis of elastic scattering involved in the time-dependent relaxation of Bennett holes. The general description is quite complex, and this particular report concerns the case where the active particles are much lighter than the dominant collision partner, an idealized limit which has been named the Lorentz gas. For the Lorentz gas one can obtain a good analytic description of the relaxation process. (ERA citation 06:001455)

SAND-80-8502 PC **A03**/MF **A01**
Sandia National Labs., Livermore, CA.
Phase Diagram of NaNO sub 3 /KNO sub 3.
C. M. Kramer, and C. J. Wilson. Apr 80, 29p
Contract EY-76-C-04-0789

The binary phase diagram of NaNO sub 3 and KNO sub 3 was studied using differential scanning calorimetry (DSC). The phase diagram was modeled with regular solution theory. By fitting the model to the minimum melting point of the system, the regular solution parameters and the heats of mixing for solid solutions of NaNO sub 3 and KNO sub 3 were estimated. Good agreement was obtained between our data for the liquidus, the previously determined liquidus, and the liquidus calculated from the model. (ERA citation 05:024458)

SERI/PR-9276-T1 PC **A02**/MF **A01**
Rockwell International, Thousand Oaks, CA.
Electrochemical Photovoltaic Cells/Stabilization and Optimization of II-VI Semiconductors. First Technical Progress Report, 15 April 1980-30 June 1980.
R. Noufi, D. Tench, and L. Warren. 20 Jul 80, 23p
Contract AC02-77CH00178

The overall goal of this program is to provide the basis for designing a practical electrochemical solar cell based on the II-VI compound semiconductors. Emphasis is on developing new electrolyte redox systems and electrode surface modifications which will stabilize the II-VI compounds against photodissolution without seriously degrading the long-term solar response. The bulk electrode material properties are also being optimized to provide the maximum solar conversion efficiency and greatest inherent electrode stability. Factors limiting the short circuit current of the n-CdSe/methanol/ferro-ferricyanide system to 17.5 mA/cm exp 2 have been identified. The principal limiting factor is apparently specific adsorption of hexacyanoferrate species on the electrode surface which occurs at higher redox couple concentrations and slows the overall charge transfer process. Ion pairing also occurs, resulting in a low mass transport rate (smaller diffusion coefficients and increased solution viscosity), and probably enhances the degree of specific adsorption. Improvements in the performance of this system will require mitigation of the interactions between the redox species and the electrode surface, e.g., via electrolytes with reduced ion-pairing tendencies or the use of electrode surface films. Photoelectrochemically generated polypyrrole films have been shown to protect CdX photoanodes from dissolution while permitting electron exchange with the electrolyte. Current effort is directed toward improving the film adhesion and optimizing the performance characteristics. (ERA citation 05:037850)

UCID-18766 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Comparison Assay of a Gold Plating Solution by Controlled-Potential Coulometry and Fire Assay.
J. E. Harrar, M. C. Waggoner, and J. W. Loy. 7 Aug 80, 9p
Contract W-7405-ENG-48

A commercial gold-electroplating solution was assayed for its total gold content by two high-precision techniques and the results were compared. The solution was analyzed using controlled-potential coulometry at the authors' laboratory and by the fire assay technique at Metallurgical Laboratories, Inc., of San Francisco. Agreement between the two laboratories was within 0.3% for the total quantity of gold in two containers that were sampled, and within 0.5 to 1.0% for the concentrations of gold in the solutions. (ERA citation 05:033923)

UCRL-52810(Pt.1) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Programs in BASIC Language for Graphite Furnace Atomic Absorption Using the Method of Additions. Part 1. Operating Instructions.
W. G. Boyle, Jr., and D. P. Ryan. 27 Jul 79, 40p
Contract W-7405-ENG-48

These instructions describe how to use BASIC language programs to process data from atomic absorption spectrophotometers using the graphite furnace and the method of additions calibration technique. The instructions cover loading the programs, responding to computer prompts, choosing among various options for processing the data, performing operations with an automatic sampler, and producing reports. How the programs interact with each other is also explained. Examples of computer/operator dialogue are presented for typical cases. In addition, a concise set of operating instructions is included as an appendix. (ERA citation 05:004779)

UCRL-52810(Pt.2) PC **A07**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Programs in BASIC Language for Graphite Furnace Atomic Absorption Using the Method of Additions. Part 2. Documentation.
W. G. Boyle, Jr., and D. P. Ryan. Aug 79, 149p
Contract W-7405-ENG-48

There are four computer programs, written in the BASIC language, used for taking and processing data from an atomic absorption spectrophotometer using the graphite furnace and the method of additions for calibration. The programs chain to each other and are divided into logical sections that have been flowcharted. The chaining sequences, general features, structure, order of subroutines and functions, and the storage of data are discussed. In addition, variables are listed and defined, and a complete listing of each program with a symbol occurrence table is provided. (ERA citation 05:016245)

UCRL-84562 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
High Temperature Enthalpies of Zinc Sulfate and Zinc Oxy-Sulfate.
P. K. Hosmer, and O. H. Krikorian. 23 Jun 80, 37p
CONF-800670-2
Contract W-7405-ENG-48
European thermophysical properties conference, Antwerpen, Belgium, 30 Jun 1980.

The high temperature enthalpies (500 to 1200 K) of zinc sulfate and zinc oxy-sulfate were measured using a drop calorimeter. The data include determination of the transformation enthalpy associated with the alpha to beta phase transition of zinc sulfate which occurs at approximately 1015 K. This information extends the range of thermodynamic information for zinc sulfate into the temperature regime where zinc sulfate decomposition becomes significant and has useful applications in thermochemical cycles for the production of hydrogen. (ERA citation 05:030981)

UR-3490-1741 PC **A03**/MF **A01**
Rochester Univ., NY.
Sampling and Analysis of Suspended Particles and Vapors by Continuum Source Particle BEAMS.
B. Dahneke. 1979, 34p
Contract EY-76-C-02-3490

Two continuum source particle beam methods are proposed for the on-line measurement of suspended particles or material which is suspendable in a gas. The first method can be used to size separate the various molecular and particulate species present in the beam. The second method is used to obtain a molecular composition analysis of individual beam particles or a composition distribution for a sample containing a large number of particles. The two methods are complementary and can be used together to obtain molecular composition analyses of size-separated beam particles. (ERA citation 05:001751)

7E. Radio and Radiation Chemistry

AD-A108 614/9 PC **A02**/MF **A01**
Howard Univ., Washington, DC. Dept. of Chemistry.
Laboratory Measurements of Cometary Photochemical Phenomena.
Technical rept.,
William M. Jackson. 4 Dec 81, 23p Rept no. TR-8
Contract N00014-80-C-0305

Laboratory experiments are described that provide fundamental information about photochemical processes in comets. The yield of cometary radicals such as CN, OH, etc. can be determined as a function of photolyzing wavelength. Quantum state distributions of the internal energy of the cometary radicals can also be measured as a function of wavelength permitting one to define the recoil velocity of the fragments. This type of information supplies the data needed for more elaborate models to interpret the data being obtained on comets.

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

N82-13637/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Biological and Physical Oceanographic Observations Pertaining to the Trawl Fishery in a Region of Persistent Coastal Upwelling.
J. T. Howe, D. B. Gibson, T. O. Evans, L. Breaker, and R. C. Wrigley. Nov 81, 19p NASA-TM-81332, A-8745

An upwelling episode in the Point Sal region of the central California coast is examined by using data obtained by a data buoy. The episodes was interrupted by the abrupt abatement of the strong wind which promotes coastal upwelling. The mean hourly upwelling index is calculated to be higher than the 20 year mean monthly value. During 3 days of light wind commercial bottom trawl operations were possible. Shipboard estimates of chlorophyll content in surface waters during trawling show the high concentrations that are indicative of a rich biomass of phytoplankton, a result of the upwelling episode. Satellite imagery shows the extent of the upwelling water to be of the order of 100 km offshore; the result of many upwelling episodes. Shipboard echo sounder data show the presence of various delmersal species and of zooplakton; the latter

graze on the phytoplankton in the upper euphotic layers. The fish catch data are recorded according to species for 2 days of trawling, and the catch per trawl hour is recorded.

PB82-145921 PC **A17**/MF **A01**
National Research Council, Washington, DC.
Marine Invertebrates.
1981, 393p ISBN-0-309-03134-6
Contract N01-CM-5-3850
Library of Congress catalog card no. 81-4015.

This manual summarizes contemporary methods for maintaining and rearing marine invertebrates in laboratories without immediate access to the sea. The first part contains general information. The second part consists of chapters written by investigators who are skilled in handling specific animals or groups of animals. Detailed directions are given on the animals' care and handling, on food requirements, and on ways to meet some of the difficulties that may arise. At best, this manual can provide specific recommendations for but a small number of species from among those potentially available.

PB82-150004 PC **A09**/MF **A01**
National Marine Fisheries Service, Washington, DC.
Fishery Bulletin. Volume 79, Number 2, April 1981.
Apr 81, 185p NOAA-81103002
See also Volume 78, Number 4, PB81-232597 and PB82-150012 thru PB82-150103.

The report contains the following articles: The spawning energetics of female northern anchovy, Engraulis mordax; Development of larvae and juveniles of the rockfishes and occurrence off Oregon, with notes on head spines; Contribution to the life history of the deep-sea king crab, Lithodes couesi, in the Gulf of Alaska; The effect of the bottom on the fast start of a flatfish; Daily patterns in the activities of swordfish observed by acoustic telemetry; Growth rates of North Pacific albacore, Thunnus alalunga, based on tag returns; Economic feasibility of domestic groundfish harvest from western Alaska waters: A comparison of vessel types, fishing strategies, and processor locations; A stochastic model for the size of fish schools; Recruitment and exploitation of Gulf menhaden, Brevoortia patronus; and Natural stable carbon isotope tag traces Texas shrimp migrations.

PB82-150012
(Order as PB82-150004, PC **A09**/MF **A09**)
National Marine Fisheries Service, La Jolla, CA. Southwest Fisheries Center.
The Spawning Energetics of Female Northern Anchovy, 'Engraulis mordax',
J. Roe Hunter, and Roderick Leong. Oct 80, 17p NOAA-81103002-1
Included in Fishery Bulletin, v79 n2 p215-230 1981.

The seasonal pattern in incidence of postovulatory follicles in northern anchovy females indicated that they spawn about 20 times per year. The maturation rates of females in the laboratory indicated that they were capable of maturing a spawning batch of eggs at weekly intervals. Estimates of annual reproductive effort (egg calories/ration calories x 100) ranged from 8% for 1 year to 11% for 3-year-old females.

PB82-150020
(Order as PB82-150004, PC **A09**/MF **A09**)
Oregon State Univ., Corvallis. School of Oceanography.
Development of Larvae and Juveniles of the Rockfishes 'Sebastes entomelas' and 'S. zaventrus' (Family Scorpaenidae) and Occurrence Off Oregon, with Notes on Head Spines of 'S. mystinus', 'S. flavidus', and 'S. melanops',
Wayne A. Laroche, and Sally L. Richardson. Dec 80, 28p NOAA-81103002-2
Included in Fishery Bulletin, v79 n2 p231-257 1981.

Developmental series of larvae and juveniles of two species of northeast Pacific rockfishes (Scorpaenidae: Sebastes) are described and illustrated: S. entomelas and S. zacentrus. Descriptions include literature review, identification criteria, distinguishing features, general development, morphology, fin development, spination, scale formation, and pigmentation.

PB82-150038
(Order as PB82-150004, PC **A09**/MF **A09**)
Washington Univ., Seattle. Coll. of Fisheries.
Contribution to the Life History of the Deep-Sea King Crab, 'Lithodes couesi', in the Gulf of Alaska,
David A. Somerton. Oct 80, 12p CONTRIB-539, NOAA-81103002-3
Included in Fishery Bulletin, v79 n2 p259-269 1981.

Lithodes couesi is a deepwater relative of the commercially important Alaskan king crabs, Paralithodes camtschatica, P. platypus, and L. aequispina. Compared with the Paralithodes species, which are primarily restricted to the continental shelf, L. couesi displays a variety of features which appear to be adaptations for life in deeper water on the continental slope, including elongated legs, red coloration, inflated branchial chambers, asynchronous spawning, and large eggs.

PB82-150046
(Order as PB82-150004, PC **A09**/MF **A09**)
National Marine Fisheries Service, La Jolla, CA. Southwest Fisheries Center.
The Effect of the Bottom on the Fast Start of Flatfish 'Citharichthys stigmaeus',
P. W. Webb. Sep 80, 7p NOAA-8110300204
Included in Fishery Bulletin, v79 n2 p271-276 1981.

Fast starts of the speckled sanddab, Citharichthys stigmaeus, were initiated by a 1 volt per centimeter direct current electric shock and recorded on movie film at 250 frames per second. Observations on kinematics and performance were made for fast starts of fish accelerating in the water column.

PB82-150053
(Order as PB82-150004, PC **A09**/MF **A09**)
Woods Hole Oceanographic Institution, MA.
Daily Patterns in the Activities of Swordfish, 'Xiphias gladius' Observed by Acoustic Telemetry,
Francis G. Carey, and Bruce H. Robinson. Apr 81, 17p NOAA-81103002-5
Prepared in cooperation with California Univ., Santa Barbara. Marine Science Inst.
Included in Fishery Bulletin, v79 n2 p277-292 1981.

Horizontal and vertical movements of swordfish were studied using acoustic telemetry. Five swordfish in the Pacific and one in the Atlantic were tagged with transmitters which provided information on location, depth, and surrounding water temperature. Two of the Pacific fish showed a clear daily cycle of movement between an inshore bank during the day and deep water offshore at night. All of the swordfish responded to light, swimming deep during the day and coming near the surface at night.

PB82-150061
(Order as PB82-150004, PC **A09**/MF **A09**)
National Marine Fisheries Service, La Jolla, CA. Southwest Fisheries Center.
Growth Rates of North Pacific Albacore, 'Thunnus alalunga', Based on Tag Returns,
R. Michael Laurs, and Jerry A. Wetherall. Dec 80, 11p NOAA-81103002-6
Included in Fishery Bulletin, v79 n2 p293-302 1981.

The report gives an estimate of growth parameters for North Pacific albacore, Thunnus alalunga. These are based on tag-recapture statistics, using the standard von Bertalanffy model and an extended model.

PB82-150087
(Order as PB82-150004, PC **A09**/MF **A09**)
Washington Univ., Seattle. Coll. of Fisheries.
A Stochastic Model for the Size of Fish Schools,
James Jay Anderson. Sep 80, 10p CONTRIB-563, NOAA-81103002-8
Included in Fishery Bulletin, v79 n2 p315-323 1981.

A model is presented in the report that reproduces the frequency distribution of fish school diameters observed acoustically in waters off southern California. The rate of change of school diameter is described by an equation that includes an entrance rate of fish into a school, which is independent of the number of fish in the school, and an exit rate, which is proportional to the number.

PB82-150103
(Order as PB82-150004, PC **A09**/MF **A09**)
Texas Univ. at Austin, Port Aransas. Port Aransas Marine Lab.
Natural Stable Carbon Isotope Tag Traces Texas Shrimp Migrations,
Brian Fry. Sep 80, 10p CONTRIB-411, NOAA-81103002-10
Included in Fishery Bulletin, v79 n2 p337-345 1981.

A 1978 spring and early summer survey of Texas brown shrimp, Penaeus aztecus, showed that stable carbon isotope analysis is useful for tracing shrimp movements. At least four isotopically distinct shrimp feeding grounds exist along the Texas coast.

8B. Cartography

AD-A108 141/3 PC **A04**/MF **A01**
Army Engineer District, Omaha, NE.
Remote Sensing and Field Evaluation of Wetlands in the Sandhills of Nebraska,
Michael C. Gilbert, Michael W. Freel, and Andrew J. Bieber. Jun 80, 69p

This study documented the accuracy of Landsat wetland mapping in the Sandhills of Nebraska. Methodology for delineation of wetland communities and the determination of subirrigated meadows as wetlands has been established. Comparisons of the various remote sensor's depictions of Rice Lake proved inconclusive due to the incompatible classifications and resolutions. Significant vegetation changes have been noted in the temporal evaluation of Rice Lake. Additional studies are essential to place in proper perspective the remote sensing and field results.

AD-A108 327/8 PC **A02**/MF **A01**
Defense Mapping Agency, Washington, DC.
Defense Mapping Agency Digital Data Base Evolution,
Francis M. Mirkay. Nov 81, 20p

The Defense Mapping Agency (DMA) has massive amounts of MC&G digital data holdings resulting from programs to support DoD advanced weapons systems and automated map and chart production. The digital data is used to support the DoD and NATO countries as well as internal DMA production. DMA requires a digital data base to maintain, store, retrieve, compare, and report on this MC&G digital data. This paper addresses current DMA efforts that will evolve into an online interactive, distributed, networked data base system and its associated environment for data handled by HQ DMA and the DMA Production Centers. (Author)

AD-A108 371/6 PC **A06**/MF **A01**
Rome Research Corp., NY.
Litho Scanning Techniques.
Final technical rept. 17 Sep 80-17 May 81,
Andrew V. Douglas, Thomas V. Edwards, Michael J. Gillotte, and Marsha L. Rapke. Sep 81, 112p RRC-81-001, RADC-TR-81-229
Contract F30602-80-C-0316

This effort continued to investigate raster processing techniques, referred to as the Automatic Feature Tracking algorithm, demonstrated to be feasible under previous contract to RADC (F30602-78-C-0313). The current effort considered methods of optimizing the algorithm, determined optimal parameters to track various features, and examined alternate templates for the various features. The goal of this contract was to reduce the processing requirements, and hence the processing time, while preserving the quality of the feature tracking results. In addition to performing the feature tracking, various timing simulations were conducted to demonstrate the processing speed that could be achieved using the existing algorithm and off-the-shelf hardware. The tracking of a symbolized railroad feature could be performed at a rate of approximately ten (10) inches per minute if a computer configuration had the appropriate hardware peripherals. The DeAnza IP-5500 Image Display System and the Floating Point Systems AP-120BF are the devices that could achieve that tracking rate. Alternate hardware was examined with possible changes in the template matching algorithm and the template design to further accelerate processing speed of the feature tracking algorithm. (Author)

AD-A108 515/8 PC **A02**/MF **A01**
Defense Mapping Agency Aerospace Center, St. Louis AFS, MO.

ICFITG: A Program for Interactive Contouring from an Irregular Triangular Grid,
Robert F. Brown, and Harold Moellering. Dec 81, 17p

The computer program Interactive Contouring from an Irregular Triangular Grid (ICFITG) allows the program user to make judgements during the preparation or modification of an isarithmic map. This is accomplished interactively through the use of virtual images and devices, character commands and responses, and audio signals such that the cartographer can make decisions that affect the outcome of the final map while the program is executing. It is interactive computer graphics that form the link between the speed and repetitive processing power of the computer and the decision making power of the cartographer. The computer program ICFITG incorporates a contouring algorithm which is based on the formation of an irregular triangular grid. The use of such an algorithm ensures that the original control points lie on the surface and allows provisions to be included that give respect to surface characteristics such as breaklines. Based on research conducted at the Ohio State University, the combination of an irregular triangular grid contouring algorithm and interactive computer graphics results in a fast, flexible and easy to use computer contouring program. (Author)

AD-A108 700/6 PC **A02**/MF **A01**
Defense Mapping Agency Hydrographic/Topographic Center, Washington, DC.
Automated Slope Generation Using Raster Technology,
Michael P. Lee. Dec 81, 12p

The Sci-Tex Response 250 Mapping System has been in production at the Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC) for the past two years. Initially acquired for foreign chart modification and color separation, this cartographic system has had a significant impact in rapid response situations. Recent gains in slope generation have further enhanced the capabilities of this automated tool. (Author)

8C. Dynamic Oceanography

AD-A108 686/7 PC **A04**/MF **A01**
Science Applications, Inc., McLean, VA.
Models of Near Inertial Vertical Shear,
David M. Rubenstein. Nov 81, 70p Rept nos. SAI-82-546-WA, OPD-81-274-04
Contract N00014-81-C-0084

The physics of the interactions between the wind stress, the Ekman layer, and internal waves are reviewed. A general set of equations which describe near-inertial motions are developed. The time dependent behavior of the wind-forced Ekman layer is examined. Then we consider two classes of resonance conditions. The first involves the resonance between the wind field and Ekman pumping, while the second class is the resonance between a propagating Ekman pumping field and the internal wave field. (Author)

AD-A108 687/5 PC **A04**/MF **A01**
Science Applications, Inc., McLean, VA.
A Dynamical Model of Wind-Induced Near-Inertial Motions.
Technical rept. Nov 80-Oct 81,
David M. Rubenstein. Nov 81, 63p Rept nos. SAI-82-598-WA, OPD-TR-424-81-274-02
Contract N00014-81-C-0084

A semispectral model of upper ocean inertial motions is developed. The model is solved with a Fourier-Chebyshev expansion in the spatial dimensions, and numerically in time. The model allows the user to specify arbitrary vertical profiles of mean stratification and eddy diffusivity. The model is driven by a wind stress function which is an arbitrary function of time. The model is tested against analytic time-dependent Ekman-layer solutions. The comparisons are excellent. The model is used to simulate the response to a delta-function wind stress impulse. Two cases are presented; one with uniform profiles of stratification and eddy diffusivity, and one with nonuniform profiles. Response functions of wavenumber and frequency are computed for current velocity and shear. The response is shown to be in resonance near the lowest two modes of the internal wave dispersion relation. (Author)

AD-A108 690/9 PC **A02**/MF **A01**
Oregon State Univ., Corvallis. School of Oceanography.
EXPOSURE: A Newsletter for Ocean Technologists. Volume 9, Number 5,
Roderick Mesecar. Nov 81, 9p
Contract N00014-79-C-0004

Test Results are given of a Flotsam Shedder for the Grundy Model 9021 Current Meter Continuous Shipboard Measurements of Surface Salinity.

AD-A108 701/4 MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Surface Currents, Southwest North Atlantic Ocean Including the Gulf of Mexico and Caribbean Sea.
Final rept.
Oct 81, 47p Rept no. NOO-SP-1400-NA-9
Availability: Microfiche copies only.

This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to the user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties. The surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current. (Author)

AD-A108 711/3 PC **A02**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
Erosion and Deposition in Interplain Channels of the Maury Channel System, Northeast Atlantic.
Summary rept.,
P. Lonsdale, C. D. Hollister, and L. Mayer. 4 Aug 80, 21p Rept no. MPL-U-1/80
Contracts N00014-75-C-0704, N00014-75-C-0749
Pub. in Oceanologica Acta, v4 n2 p185-201 1981. Abstract in French. Prepared in cooperation with Rhode Island Univ., Narragansett. Contract N00014-74-C-0262.

No abstract available.

AD-A108 712/1 PC **A02**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
On the Use of Doppler Sonar for Internal Wave Measurements.
Summary rept.,
Robert Pinkel. 1 Feb 80, 24p Rept no. MPL-U-63/79
Contracts N00014-75-C-0704, N00014-79-C-0472
Pub. in Deep-Sea Research, v28A n3 p269-289 1981. Sponsored in part by Contracts N00014-75-C-0749, N00014-80-C-0219 and Grant NSF-OCE79-09569.

No abstract available.

PB82-139395 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution, MA.
A Four-Dimensional Primitive Equation Model for Coupled Coastal - Deep Ocean Studies.
Technical rept.,
Dale B. Haidvogel. Oct 81, 32p WHOI-81-90
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.

A prototype four-dimensional continental shelf/deep ocean model is described. In its present form, the model incorporates the effects of finite-amplitude topography, advective nonlinearities, and variable stratification and rotation. The model can be forced either directly by imposed atmospheric windstress and surface pressure distributions, and energetic mean currents imposed by the exterior oceanic circulation; or indirectly by initial distributions of shoreward propagating mesoscale waves and eddies. To avoid concerns over the appropriate specification of 'open' boundary conditions on the cross-shelf and seaward model boundaries, a periodic channel geometry (oriented along-coast) is used. The model employs a traditional finite-difference expansion in the cross-shelf direction, and a Fourier (periodic) representation in the long-shelf coordinate.

PB82-148065 PC **A10**/MF **A01**
Woods Hole Oceanographic Institution, MA.
The Vertical Structure of the Wind-Driven Circulation.
Doctoral thesis,
William R. Young. Oct 81, 220p WHOI-81-89
Grant NSF-OCE78-25692

This thesis consists of three loosely related theoretical studies. In chapters 1-3 the physical mechanisms which determine the three dimensional structure of the currents in the Sverdrup interior of a wind-driven gyre are discussed. A variety of simple analytic models suggest that the subsurface geostrophic contours in a wind gyre are closed and so the flow in these regions is not determined by lateral boundary conditions. Instead a turbulent, quasigeostrophic extension of the Batchelor-Prandtl theorem suggests that the potential vorticity is uniform inside these laterally isolated regions. In chapter 4 the propagation of Rossby wave trains through slowly varying forced mean flows is examined by solving the linearized potential vorticity equation.

8E. Geodesy

AD-A108 326/0 PC **A02**/MF **A01**
Defense Mapping Agency Hydrographic/Topographic Center, Washington, DC.
Applications of the DoD World Geodetic System - 1972 to Charting by the Use of a Semi-Automated System.
Final technical rept.,
Donald Wirak. 26 Jan 81, 13p

DMA has a semi-automated system that is used to evaluate the horizontal datum of maps and charts for geodetic accuracy. Geodetic control descriptions in the DMAHTC library of holdings are used to make this evaluation. The computer system gives geodetic shifts to source maps, surveys, and charts. The chart is compiled from a panel base with the WGS-72 shifts applied. The final color proof of the chart is evaluated and checked to see if it is on the WGS-72 datum. Several charts will be exhibited and explained from a cartographic point of view as to how they were placed on WGS-72 datum. The exhibited charts are new charts of the Panama Canal and the Pacific coast of Panama. Examples of how the program was used to improve the geodetic accuracy of the charts on the last stage of compilation will be exhibited. (Author)

ORNL/CSD-63 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Solution of Large-Scale Sparse Least Squares Problems Using Auxiliary Storage.
A. George, M. T. Heath, and R. J. Plemmons. Aug 80, 41p
Contract W-7405-ENG-26

Very large sparse linear least-squares problems arise in a variety of applications, such as geodetic network adjustments, photogrammetry, earthquake studies, and certain types of finite element analysis. Many of these problems are so large that it is impossible to solve them without using auxiliary storage devices. Some problems are so massive that the storage needed for their solution exceeds the virtual address space of the largest machines. A method for solving such problems on a typical (large) computer is described, and the results of some experiments illustrating the effectiveness of this approach are provided. The method includes an automatic partitioning scheme that is essential to the efficient management of the data on auxiliary files. 8 figures, 2 tables. (ERA citation 05:033162)

8F. Geography

AD-A108 620/6 PC **A16**/MF **A01**
Department of the Air Force, Washington, DC.
Environmental Impact Analysis Process. Deployment Area Selection and Land Withdrawal/Acquisition DEIS. Chapter III. Part I. Affected Environment.
Dec 80, 375p
See also Chapter 3, Part 2, AD-A108 621. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Geotechnically suitable land for the deployment of M-X in the Nevada/Utah region is shown in gray in Figure 3.1-1. Those areas in which there is currently most interest are shown in black. Geotechnically suitable land in the Texas/New Mexico region is shown in Figure 3.1-2. Environmental study area boundaries extend beyond the geotechnical limits. The extent to which environmental study areas exceeded the geotechnical limits varies according to the discipline under study. (Author)

AD-A108 621/4 PC **A11**/MF **A01**
Department of the Air Force, Washington, DC.
Environmental Impact Analysis Process. Deployment Area Selection and Land Withdrawal/Acquisition DEIS. Chapter III. Part II. Affected Environment.
Dec 80, 230p
See also Chapter 4, Part 1, AD-A108 622. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The Proposed Action and eight alternatives present deployment systems featuring full deployment of 200 missiles in Nevada/Utah or Texas/New Mexico, and split basing deployment of approximately one-half the missiles in Nevada/Utah and one-half in Texas/New Mexico. The Proposed Action and alternatives each require two operating base (OB) complexes. Base site locations under study are in the vicinity of Ely and Coyote Spring Valley, Nevada; Beryl, Milford, and Delta, Utah; Clovis, New Mexico; and Dalhart, Texas. (Author)

AD-A108 670/1 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Analysis of Methodologies Used for the Assessment of Wetlands Values.
Final rept.,
Robert I. Lonard, Ellis J. Clairain, Jr., Robert T. Huffman, J. W. Hardy, and Linda D. Brown. Sep 81, 81p

The results of a research study designed to identify and evaluate methodologies that assess inland and coastal wetland functions are discussed in this report. Discussions include a critical review of the current literature, identification of research needs, recommendations of currently available wetlands evaluation methodologies, and recommendations to improve the consistency of wetlands evaluation methodologies. (Author)

8G. Geology and Mineralogy

AD-A108 153/8 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Seismic Velocity Models for Western Alluvial Basins.
Environmental research papers,
James C. Battis. 5 May 81, 27p Rept nos. AFGL-TR-81-0139, AFGL-ERP-740

A study was made of the open literature on the geologic structure of the Basin and Range Province of the western United States. Based on this study, an attempt was made to derive a model of a typical basin for use in estimating the seismic ground motion characteristics of alluvial basins in the designated MX deployment area. Among the topics investigated are dimensions and structure of an average basin and characteristic seismic velocities in the basin interiors. In addition, many of the basins are expected to show significant variations from a typical structure and these variations are discussed. (Author)

AD-A108 493/8 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
A Comparison of the Upper Mantle Structure beneath North America and Europe.
Interim scientific rept.,
L. J. Burdick. 25 Aug 80, 13p LDGO-3147, AFOSR-TR-81-0763
Contract F49620-79-C-0021, ARPA Order-1774
Pub. in Jnl. of Geophysical Research, v86 nB7 p5926-5936, 10 Jul 81.

No abstract available.

N82-13595/5 PC **A10**/MF **A01**
Lunar and Planetary Inst., Houston, TX.
Papers Presented to the Conference on the Processes of Planetary Rifting.
1981, 218p LPI-CONTRIB-457, NASA-CR-165034
Conf. Held in Napa Valley, Calif., 3-5 Dec. 1981; Sponsored by NASA, and NSF and American Geophysical Union.

The basic problems of processes of planetary rifting are addresed from the following viewpoints: (1) speculation as to the origin and development of rifts; (2) rifts on other planets; (3) tectonics; (4) geology; (5) chemistry of the lithosphere; (6) physics of the lithosphere; and (7) resources associated with rifting. The state of ignorance on the subject and its remedy is debated.

PAT-APPL-6-295 167 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Bonded Bulk Graphite and Process for Bonding.
Patent Application,
Dennis M. Riggs, and Edward L. Harvey. Filed 21 Aug 81, 12p AD-D009 050/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Bulk pieces of graphite bonded with a graphitizable binder comprising a liquid crystalline component of pitch, which softens at about 240 C and becomes very fluid at about 300 C to about 500 C. The bonded graphite pieces appear as a monolithic material even under 1000x magnification. The bonding is effected under vacuum or in an inert atmosphere at temperatures of from about 700 C to about 3000 C, usually about 1000 C to about 1500 C, under pressure of from about 20 psi to about 1000 psi applied in a direction normal to the bonding surface. (Author)

PB82-141755 PC **A04**/MF **A01**
Massachusetts Univ., Amherst. National Park Service Cooperative Research Unit.
Preliminary Investigation of the Geobotanical Evolution of Provincetown Peninsula.
Final rept.,
Mark A Benedict, and Stephen P. Leatherman. 1978, 61p UM-NPSCRU-38
Contract NPS-CX-1600-7-0031

The Provincetown Peninsula, situated at the outer tip of Cape Cod, is an excellent example of a large coastal landmass created by marine and eolian (wind) processes. Though most of Cape Cod is composed of glacial sediments in the form of terminal moraines and outwash plains, the Provincetown Peninsula was formed by deposition of sediments eroded from these glacial deposits. The sediments were moved by longshore currents and wave action and were subsequently reworked and shaped by the wind to form coastal dunes. The origin of the Provincetown Peninsula was investigated by utilizing both botanical and geological techniques. Vegetation mapping of the Province Lands was used to delineate the present plant communities of the interdunal swale areas.

PB82-147380 PC **A04**/MF **A01**
Dunn Geoscience Corp., Latham, NY.
Analysis of Potential Geothermal Resources and Their Use: Lebanon Springs, New York,
James R. Dunn, and William E. Cutcliffe. Apr 81, 59p NYSERDA-81-4

This project involved the effort to determine the feasibility of using previously identified warm waters at Lebanon Springs, New York, or elsewhere in the Capital District, as an energy source. In addition to geologic mapping of the Lebanon Springs area and Williamstown, Massachusetts area, thermal gradients were measured in 25 abandoned water wells in the area and the silica content and water temperatures of 78 active domestic water wells were determined.

PB82-857871 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Paleomagnetism. 1975-January, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 82.
Jan 82, 325p

This bibliography covers investigations, analyses, and interpretations of paleomagnetic records and mechanisms from many geographic locations and specific geologic formations around the world. The history of the geomagnetic field with respect to pole position, pole direction, and polar wander paths in the geologic past are considered. Some attention is given to general principles. (Contains 289 citations fully indexed and includes a title list.)

SAND-80-0769 PC **A03**/MF **A01**
Sandia National Labs., Livermore, CA.
Thermal Conductivity of Silicic Tuffs: Predictive Formalism and Comparison with Preliminary Experimental Results.
A. R. Lappin. Jul 80, 50p
Contract AC04-76DP00789

Performance of both near- and far-field thermomechanical calculations to assess the feasibility of waste disposal in silicic tuffs requires a formalism for predicting thermal conductivity of a broad range of tuffs. This report summarizes the available thermal conductivity data for silicate phases that occur in tuffs and describes several grain-density and conductivity trends which may be expected to result from post-emplacement alteration. A bounding curve is drawn that predicts the minimum theoretical matrix (zero-porosity) conductivity for most tuffs as a function of grain density. Comparison of experimental results with this curve shows that experimental conductivities are consistently lower at any given grain density. Use of the lowered bounding curve and an effective gas conductivity of 0.12 W/m exp 0 C allows conservative prediction of conductivity for a broad range of tuff types. For the samples measured here, use of the predictive curve allows estimation of conductivity to within 15% or better, with one exception. Application and possible improvement of the formalism are also discussed. (ERA citation 05:032890)

SAND-80-1671 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Comparative Assessment of Five Potential Sites for Hydrothermal-Magma Systems: Energy Transport.
H. C. Hardee. Sep 80, 18p
Contract AC04-76DP00789

A comparative assessment of five sites is being prepared as part of a Continental Scientific Drilling Program (CSDP) review of thermal regimes for the purpose of scoping areas for future research and drilling activities. This background report: discusses the various energy transport processes likely to be encountered in a hydrothermal-magma system, reviews related literature, discusses research and field data needs, and reviews the sites from an energy transport viewpoint. At least three major zones exist in the magma-hydrothermal transport system: the magma zone, the hydrothermal zone, and the transition zone between the two. Major energy transport questions relate to the nature and existence of these zones and their evolution with time. Additional energy transport questions are concerned with the possible existence of critical state and super-critical state permeable convection in deep geothermal systems. A review of thermal transport models emphasizes the fact that present transport models and computational techniques far outweigh the scarcity and quality of deep field data. (ERA citation 05:037924)

SAND-80-2172 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Model for Transient Creep of Southeastern New Mexico Rock Salt.
W. Herrmann, W. R. Wawersik, and H. S. Lauson. Nov 80, 47p
Contract AC04-76DP00789

In a previous analysis, existing experimental data pertaining to creep tests on rock salt from the Salado formation of S.E. New Mexico were fitted to an exponential transient creep law. While very early time portions of creep strain histories were not fitted very well for tests at low temperatures and stresses, initial creep rates in particular generally being underestimated, the exponential creep law has the property that the transient creep strain approaches a finite limit with time, and is therefore desirable from a creep modelling point of view. In this report, an analysis of transient creep is made. It is found that exponential transient creep can be related to steady-state creep through a universal creep curve. The resultant description is convenient for creep analyses where very early time behavior is not important. (ERA citation 06:004266)

UCRL-52884 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Summary of Measured Medium Properties of Paleozoic Rocks at the DOE Nevada Test Site.
H. L. McKague. 2 Jan 80, 13p
Contract W-7405-ENG-48

Selected measurements of the bulk density, grain density, sonic velocity, water content, porosity, and saturation of Paleozoic rocks beneath Yucca Flat are compiled. The bulk density and sonic velocity data show these measurements to be within the range established by similar measurements in other areas. Comparisons with values used in TENSOR calculations suggest that the values used in most calculations are sufficiently conservative for containment evaluation. 2 figures, 3 tables. (ERA citation 05:014445)

UCRL-52906 PC **A08**/MF **A01**
Lawrence Livermore National Lab., CA.
Earth Sciences Division Collected Abstracts: 1979.
A. L. Henry, and L. L. Schwartz. 30 Apr 80, 154p
Contract W-7405-ENG-48

This report is a compilation of abstracts of papers, internal reports, and talks presented during 1979 at national and international meetings by members of the Earth Sciences Division, Lawrence Livermore Laboratory. The arrangement is alphabetical (by author). For a given report, a bibliographic reference appears under the name of each coauthor, but the abstract iself is given only under the name of the first author or the first Earth Sciences Division author. A topical index at the end of the report provides useful cross references, while indicating major areas of research interest in the Earth Sciences Division. (ERA citation 06:008320)

8H. Hydrology and Limnology

AD-A108 342/7 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Ground-Truth Observations of Ice-Covered North Slope Lakes Imaged by Radar,
W. F. Weeks, A. J. Gow, and R. J. Schertler. Oct 81, 24p Rept no. CRREL-81-19

Field observations support the interpretation that differences in the strength of radar returns from the ice covers of lakes on the North Slope of Alaska can be used to determine where the lake is frozen completely to the bottom. An ice/frozen soil interface is indicated by a weak return and an ice/water interface by a strong return. The immediate value of this result is that SLAR (side-looking airborne radar) imagery can now be used to prepare maps of large areas of the North Slope showing where the lakes are shallower or deeper than 1.7m (the approximate draft of the lake ice at the time of the SLAR flights). The bathymetry of these shallow lakes is largely unknown and is not obvious from their sizes or outlines. Such information could be very useful, for example in finding suitable year-round water supplies. (Author)

AD-A108 718/8 PC **A05**/MF **A01**
Corps of Engineers, Buffalo, NY. Buffalo District.
Feasibility Study of Shoreline Protection and Lake Level Regulation for Lake Ontario. Reconnaissance Report. Volume I. Main Report.
Nov 81, 83p
See also Volume 2, AD-A108 719.

This report identifies problems and needs along the United States shoreline of Lake Ontario associated with shore erosion and coastal flooding. The report includes a survey of existing conditions including those associated with the natural and human environment. Alternatives are formulated to address the needs and include lake level vegetation and standard structural and nonstructural shoreline protection measures. Significant flood and erosion areas are identified based on dollar damages and the feasibility of protection considered based on the costs of protection. Several areas were identified where shoreline protection may be feasible. (Author)

AD-A108 719/6 PC **A21**/MF **A01**
Corps of Engineers, Buffalo, NY. Buffalo District.
Feasibility Study of Shoreline Protection and Lake Level Regulation for Lake Ontario. Reconnaissance Report. Volume 2. Appendices.
Nov 81, 486p
See also Volume 1, AD-A108 718.

Appendix A: Existing conditions, Future conditions, Problems-needs-concerns, Constraints and objectives, Formulation of alternative plans, Assessment and evaluation of management measures, and study management; Appendix B (Issues and Concerns): Planning, Engineering, Environment, Socio-Economic, Regional problems, Alternative measures, and Cost sharing; Appendix C - U.S. Fish and Wildlife Service Planning and Letters; and Appendix D - Significant Environmental Areas.

N82-13468/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Laboratory Measurements of Physical, Chemical, and Optical Characteristics of Lake Chicot Sediment Waters.
W. G. Witte, C. H. Whitlock, J. W. Usry, W. D. Morris, and E. A. Gurganus. Dec 81, 30p NASA-TP-1941, L-14714

Reflectance, chromaticity, diffuse attenuation, beam attenuation, and several other physical and chemical properties were measured for various water mixtures of lake bottom sediment. Mixture concentrations range from 5 ppm to 700 ppm by weight of total suspended solids in filtered deionized tap water. Upwelled reflectance is a nonlinear function of remote sensing wave lengths. Near-infrared wavelengths are useful for monitoring highly turbid waters with sediment concentrations above 100 ppm. It is found that both visible and near infrared wavelengths, beam attenuation correlates well with total suspended solids ranging over two orders of magnitude.

PB82-140815 PC **A11**/MF **A01**
JACA Corp., Fort Washington, PA.
Clean Lakes Program Guidance Manual.
Dec 80, 249p EPA-440/5-81-003
Contract EPA-68-03-2673

This manual has been prepared to guide the States in developing their own lake restoration and protection programs, in obtaining Federal Clean Lakes Program assistance, and conducting lake projects. Policy, procedures, and technology are discussed, making this manual useful to State environmental and natural resources agency officials, whether their responsibilities are technical or administrative. Governmental agencies which carry out lake projects under subagreements with the State, or watershed, lake associations or citizen groups which initiate a lake project will also find the manual useful.

PB82-145053 PC **A25**/MF **A01**
Geological Survey, Louisville, KY. Water Resources Div.
Water Resources Data for Kentucky, Water Year 1979.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
Mar 80, 600p USGS/WRD/HD-80/024, USGS-WDR-KY-79-1
See also report for Water Year 1978, PB-296 401. Prepared in cooperation with the Commonwealth of Kentucky, Kentucky Univ., Lexington, and Kentucky Geological Survey, Lexington.

Water resources data for the 1979 water year for Kentucky consist of records of stage, discharge, and water quality of streams; stage and contents of lakes; and water levels and water quality of wells and springs. This report contains discharge records from 112 gaging stations; stage and contents for 15 lakes; water-quality for 39 stations; suspended-sediment data for 43 stations; daily temperature for 35 stations; daily specific conductance for 23 stations; ground water levels for 70 recording, 117 partial sites, and 1 flowing well; water-quality data from 225 coal hydrology sites, 4 springs and 29 wells; and miscellaneous temperature and specific conductance data from the 114 gaging stations.

PB82-145343 PC **A05**/MF **A01**
Illinois State Water Survey Div., Champaign.
Sampling Frequency for Water Quality Monitoring.
Final rept.,
Robert H. Harmeson, and Michael J. Barcelona. Nov 81, 95p ISWS-81-CON-279
Grant EPA-R-804337

The results of a comprehensive study of the effect of sampling frequency on observations of trends in water quality parameters are reported for a 9-station network in Illinois. The study period covered two discontinuous annual periods from October 1976 - October 1977 and June 1978 - June 1979. Based on an acceptable deviation of 10 percent from the annual daily mean values, optimum sampling frequencies were found to vary from monthly to more often than daily. The average percent deviation due to monthly sampling was found to be acceptable for the following water quality parameters: sodium, chloride, alkalinity, hardness, and total dissolved solids. More frequent sampling seems to be indicated for nitrate, ammonium, and dissolved and total phosphorus. The remaining parameters -- iron, manganese, copper, zinc, and turbidity -- demand more frequent sampling than on a monthly basis to ensure acceptable deviations from long-term means.

PB82-146234 PC **A06**/MF **A01**
Illinois State Water Survey Div., Champaign.
A 'Randon-Walk' Solute Transport Model for Selected Groundwater Quality Evaluations,
Thomas A. Prickett, Thomas G. Naymik, and Carl G. Lonnquist. 1980, 110p ISWS/BUL-65/81

A generalized computer code is given that can simulate a large class of solute transport problems in groundwater. The effects of convection, dispersion, and chemical reactions are included. The solutions for groundwater flow include a finite difference formulation. The solute transport portion of the code is based on a particle-in-a-cell technique for the convective mechanisms, and a random-walk technique for the dispersion effects. The code can simulate one- or two-dimensional nonsteady/steady flow problems in heterogeneous aquifers under water table and/or artesian or leaky artesian conditions. The program covers time-varying pumpage or injection by wells, natural or artificial recharge, the flow relationships of water exchange between surface waters and groundwater.

PB82-149345 PC **A04**/MF **A01**
Bureau of Reclamation, Denver, CO. Engineering and Research Center.
Water Quality of the Proposed Norden Reservoir, Nebraska, and its Implications for Fishery Management,
James W. Yahnke. May 81, 61p REC-ERC-81-8

The report raises questions concerning oxygen depletion in Norden Reservoir. To fully respond to those questions, a combination of nutrient loading models and a temperature simulation model were used to project the trophic state, productivity, and duration of stratification of the reservoir. The trophic state index indicates that the reservoir would be eutrophic; the estimated mean annual chlorophyll 'a' concentration indicated a high likelihood that algal blooms would occur. The reservoir and the river downstream are expected to support a cold-water fishery.

8I. Mining Engineering

AD-A108 456/5 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Mining on National Park Service Lands--What Is At Stake.
24 Sep 81, 59p Rept no. GAO/EMD-81-119
Report to the Chairman, Subcommittee on Mines and Mining, House Committee on Interior and Insular Affairs of the United States.

The Department of the Interior recommended to the Congress in 1979 that mining claims on certain National Park Service lands be acquired for environmental protection. GAO found that these recommendations were based on vague and misleading environmental and cost data and, if implemented, could result in costs substantially in excess of the reported estimates. GAO also found that Interior did not fully analyze the mineral supply implications of its recommendations. Specifically, Interior failed to assess adequately the effects of acquiring the mining claims on the U.S. need for the minerals and the cost to replace them from other sources. The National Park Service now states that current mining regulations have ensured that mining on these park lands is occurring in an environmentally acceptable manner. However, NPS had not considered less costly means of achieving the same results. This is particularly true for Death Valley National

Monument, an area historically and currently important for mineral production.

DOE/IA/10066-01 PC **A04**/MF **A01**
Soros Associates, Inc., New York.
Overview of United States Coal Export Terminals.
Sep 80, 57p
Contract AP01-80IA10066

Existing coal export ports in the United States are in general not designed to the standards compatible with the current state of the art. The United States has a current coal export capacity in the order of 83 million tons per year. This could be increased to 138 million tons per year through a process of modernization and expansion which would take about six to eight years for full realization. Even if this expansion program took place it would not result in an overall coal export system that was economically competitive due to the fact that our export terminals are generally outmoded and cannot accommodate the large vessels engaged in the world coal trade and which can be accommodated at the major coal destination ports in Europe and Japan. In order for the United States to achieve an economically competitive posture in the world coal trade, new ports that will handle 150,000 to 250,000 DWT ships are needed. The new terminals must be designed to receive coal efficiently and minimize the demurrage costs for both railcars on the delivery side and ships on the load out side. There are port sites available in the US which could be developed to effectively handle the increased requirements. Each major new port could easily be designed to handle 20 to 50 million tons per year at ultimate capacity subject to the availability of coal from the source at a reasonable cost. New port construction is needed to satisfy the projected demand at a reasonable cost and to provide for the obsolescence of existing facilities. Decisions are needed now so that the ports will be operating 20 years from now and serve as replacements for present facilities which are becoming obsolete. The government of the United States can and must play a major role if success is to be achieved. (ERA citation 05:037578)

DOE/ID/12018-5 PC **A04**/MF **A01**
Colorado Geological Survey, Denver.
Colorado Geothermal Commercialization Program.
F. C. Healy. Apr 80, 53p
Contract FC07-79ID12018

Chaffee County, located in central Colorado, has immense potential for geothermal development. This report has been prepared to assist residents and developers in and outside the area to develop the hydrothermal resources of the county. Data has been collected and interpreted from numerous sources in order to introduce a general description of the area, estimate energy requirements, describe the resources and postulate a development plan. Electric power generation and direct heat application potential for the region are described. (ERA citation 06:004704)

FE-9047-2 PC **A11**/MF **A01**
Ayers (Emory) Associates, Inc., New York.
Application of Maintenance Management Techniques to Underground Coal Mining Face Equipment. Final Technical Report, November 30, 1979.
F. E. Hill, and P. B. Lilly. Nov 79, 246p
Contract AC01-77ET12479

The program described in this manual requires considerable participation from underground maintenance and production personnel. In addition, the establishment of a maintenance planner or maintenance planning department is key to: scheduling major maintenance operations, coordinating management information and focusing resources to resolve critical problems. (ERA citation 05:037561)

LA-8280-HDR PC **A12**/MF **A01**
Los Alamos Scientific Lab., NM.
Hot Dry Rock Geothermal Energy Development Program. Annual Report, Fiscal Year 1979.
G. M. Cremer, R. B. Duffield, M. C. Smith, and M. G. Wilson. Aug 80, 255p
Contract W-7405-ENG-36

The Fenton Hill Project is still the principal center for developing methods, equipment, and instrumentation for creating and utilizing HDR geothermal reservoirs. The search for a second site for a similar experimental system in a different geological environment has been intensified, as have the identification and characterization of other HDR areas that may prove suitable for either experimental or commercial development. The Phase I fracture system was enlarged during FY79. Drilling of the injection well of the Phase II system began at Fenton Hill in April 1979. Environmental monitoring of the Fenton Hill area continued through FY79. The environmental studies indicate that the hot dry rock operations have caused no significant environmental impact. Other supporting activities included rock physics, rock mechanics, fracture mapping, and instrumentation development. Two closely related activities - evaluation of the potential HDR energy resource of the US and the selection of a site for development of a second experimental heat-extraction system generally similar to that at Fenton Hill - have resulted in the collection of geology, hydrology, and heat-flow data on some level of field activity in 30 states. The resource-evaluation activity included reconnaissance field studies and a listing and preliminary characterization of US geothermal areas in which HDR energy extraction methods may be applicable. The selection of Site 2 has taken into account such legal, institutional, and economic factors as land ownership and use, proximity to possible users, permitting and licensing requirements and procedures, environmental issues, areal extent of the geothermal area, and visibility to and apparent interest by potential industrial developers. (ERA citation 05:037928)

LA-8474-MS PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Coal Preparation Waste Micromineralogy.
J. M. Williams, N. E. Elliott, E. A. Hakkila, W. B. Hutchinson, and L. S. Levinson. Aug 80, 71p
Contract W-7405-ENG-36

This report summarizes work conducted at the Los Alamos Scientific Laboratory on microscope and microprobe studies of coal preparation wastes from the Illinois Basin and middle Appalachia. Sample treatment techniques and probing methods are presented. Photomicrographs of the many mineral types and morphologies we observed are also presented. This document is not a treatise, but rather an attempt to present a cross section of results obtained during our investigation over a 5-year period. (ERA citation 06:004503)

LA-8562-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Basic Research Needed for the Development of Geothermal Energy.
R. L. Aamodt, and R. E. Riecker. Oct 80, 21p
Contract W-7405-ENG-36

Basic research needed to facilitate development of geothermal energy is identified. An attempt has been made to make the report representative of the ideas of productive workers in the field. The present state of knowledge of geothermal energy is presented and then specific recommendations for further research, with status and priorities, are listed. Discussion is limited to a small number of applicable concepts, namely: origin of geothermal flux; transport of geothermal energy; geothermal reservoirs; rock-water interactions, and geophysical and geochemical exploration. (ERA citation 06:004707)

LA-8656-MS PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Uranium Mining and Milling Work Force Characteristics in the Western US.
D. A. Rapp. Dec 80, 44p
Contract W-7405-ENG-36

This report presents the results of a survey of the socioeconomic characteristics associated with 11 uranium mine and mill operations in 5 Western States. Comparisons are made with the socioeconomic characteristics of construction and operating crews for coal mines and utility plants in eight Western States. Worker productivity also is compared with that in similar types of coal and uranium mining operations. We found that there existed no significant differences between the socioeconomic characteristics of construction and operating crews and the secondary employment impacts associated with uranium mines and mills when compared with those associated with coal mines and utility plants requiring similar skills at comparable locations. In addition, our survey includes a comparison of several characteristics associated with the households of basic and nonbasic work forces and concludes that significant changes have occurred in the last 5 yr. Accordingly, we recommend additional monitoring and updating of data used in several economic forecasting models to avoid unwarranted delays in achieving national energy goals. (ERA citation 06:011597)

ORNL/TM-7400 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Composition of Gases Vented from a Condenser.
R. N. Lyon. Aug 80, 13p
Contract W-7405-ENG-26

Designers of systems that involve condensers often need to predict the amount of process vapor that accompanies the noncondensable gases that are vented from the condensers. An approximation is given that appears to provide, in many cases, reasonably accurate values for the mole ratio of process vapor to noncondensable gases in the vented mixture. The approximation is particularly applicable to flash and direct-contact power systems for geothermal brines and ocean thermal energy conversion (OTEC). More rigorous relationships are available for exceptional cases. (ERA citation 05:032118)

PB82-135468 PC **A03**/MF **A01**
Bureau of Mines, Washington, DC.
Alumina Availability--Domestic: A Mineral Availability System Appraisal.
Information circular,
Gary R. Peterson, Robert L. Davidoff, Donald I. Bleiwas, and Richard J. Fantel. Oct 81, 30p
BUMINES-IC-8861
Errata sheet inserted.

In order to determine the potential availability of alumina to feed U.S. aluminum smelters, the Bureau of Mines evaluated 39 domestic mines and deposits of bauxite, alunite, and high-alumina clays and found that substantial increases in alumina prices would be necessary before nonbauxitic deposits could become competitive with bauxite. As part of the study, a price-tonnage relationship was developed indicating the quantity of alumina that could be produced from known deposits at various alumina prices and at a 15-pct discounted cash flow rate of return on the required capital investment. All capital and operating costs were calculated in August 1980 dollars.

PB82-135500 PC **A02**/MF **A01**
Bureau of Mines, Reno, NV. Reno Research Center.
Recovery of Byproduct Heavy Minerals from Sand and Gravel Operations in Oregon and Washington.
Rept. of investigations,
G. M. Martinez, J. M. Gomes, and M. M. Wong. Oct 81, 20p BUMINES-RI-8563

The Bureau of Mines has investigated methods for the recovery of byproduct heavy minerals from sand and gravel operations in Oregon and Washington. These heavy minerals are not currently recovered except for gold in a few areas. The recovery of byproduct heavy minerals would provide a domestic source of minerals presently imported, and a more efficient use of domestic resources would be accomplished. Samples from more than 40 locations were treated by gravity separation to yield heavy mineral concentrates (black sands). Magnetite, ilmenite, zircon, rutile, chromite, platinum-group minerals, radioactive minerals and gold were identified in the concentrates. Individual zircon, ilmenite, chromite, magnetite, and gold products were recovered from selected concentrates by low- and high-intensity magnetic, high-tension, and heavy-medium separation techniques. The recovery for the individual mineral products ranged from 67 to 95 pct.

PB82-137001 PC **A08**/MF **A01**
Ketron, Inc., Wayne, PA.
Ground Fault and Overcurrent Protection Criteria for Coal Mine AC Distribution Systems.
Open file rept. Aug 79-Oct 80,
John A. Kiefer, and Jeffery L. Kohler. 31 Oct 80, 174p BUMINES-OFR-158-81
Contract J0395035

Ground fault and overcurrent protection criteria for coal mine ac distribution systems were examined by authorization of the Bureau of Mines. The report begins with a literature review that discusses relaying topics including instrument transformers, ground fault pickup methods, static relaying, and comparison of relaying techniques. A chapter on ground fault relaying provides recommendations for maximum and minimum pickup levels as a function of maximum ground current and power system line-to-ground capacitance. Research in the area of phase overcurrent protection has resulted in a complete set of procedural recom-

mendations for the selection and setting of overcurrent relays and current transformers, molded-case circuit breakers, and distribution system fuses in coal mine power systems. The final chapter discusses relay system maintenance and introduces a unique test set that is used to test the performance of relaying systems in coal mines.

PB82-137019 PC **A03**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Noise Control of a Mine Operated Rail Personnel Carrier. Volume II. Underground Evaluation.
Open file rept. (Final) Apr 76-Sep 79,
A. G. Galaitsis, and D. Andersen. Jul 80, 35p BBN-4450, BUMINES-OFR-155-81
Contract H0166090
See also Volume 1, PB-289 711.

The two volumes of this report summarize the noise control work performed on a rail personnel carrier operated in coal mines. Volume I of the report describes the aboveground work performed to identify the noise sources, design, fabricate, and install the treatments and evaluate the treatments through noise and vibration tests. Volume II describes the underground work conducted to determine the deterioration, if any, of the treatments when the vehicle was operated normally in a mine. There were no significant changes in the acoustical performance or mechanical integrity of the treatments at the end of a 3-month period.

PB82-137308 PC **A11**/MF **A01**
West Virginia Univ., Morgantown. Dept. of Electrical Engineering.
Develop Grounding Practices for Metal/Non-Metal Mines.
Open-file rept. 1 Nov 79-31 Dec 80,
Wils L. Cooley, and Herman W. Hill, Jr. 27 Nov 81, 236p BUMINES-OFR-154-81
Contract J038025

This report analyzes electrical accident data in the metal-nonmetal mining industry. Accidents are categorized to determine the root causes. Special attention is given to accidents associated with inadequate or defective grounding of mine power systems. Recommendations are made concerning proper grounding practice, especially for dredges and for quarries in hard rock or sand. The costs of instituting the recommended practices are estimated for model mine power systems which are based on field data obtained from 37 mines and several electrical contractors. The expected benefits of various suggested safety practices are also estimated.

PB82-139304 PC **A08**/MF **A01**
WAPORA, Inc., Chevy Chase, MD.
Control of Water Pollution from Surface Mining Operations: Volume I.
Open file rept. 1 Oct 79-30 Sep 80,
David R. Jessey, Judith M. Stangl, David H. Dike, Grant R. Brown, and Edward S. Schroeder. 31 Jan 81, 172p BUMINES-OFR-161(1)-81
Contract J0199089
See also Volume 2, PB82-139312. Prepared in cooperation with Ketron, Inc., Wayne, PA.

Water pollution problems associated with surface metal-nonmetal mines throughout the United States were assessed. Three major problems were identified: acid mine drainage, toxic concentrations of heavy metals, and excessive sedimentation. Among the factors that affect the type and amount of pollutants generated at mine sites are hydrologic regime, geology, mineralogy, topography, climate, size of the mineralized area, and mining methods. Nine surface mines situated in different settings were visited and the pollution problems were studied in the report.

PB82-139346 PC **A04**/MF **A01**
Pincock, Allen and Holt, Inc., Tucson, AZ.
Cable Handling in Surface Mines.
Open file rept. 19 Sep 79-80,
B. Marshall, C. Mertian, and R. Winkle. 18 Sep 80, 62p BUMINES-OFR-157-81
Contract J0395088

Electrical trailing cable handling techniques and practices used in metal and nonmetal surface mines were investigated by obtaining information through visits to mine properties located in a variety of geological areas and climatic conditions. An analysis was made of all accidents related to cable handling that were cataloged by the Health Safety Analysis Center from 1978 through June 1980. Information was also collected from mine operators concerning near accidents and nonreported accidents. The results of this investigation were presented to the Bureau of Mines in an effort to outline recommended practices for cable handling in surface mines and to recommend additions and/or changes in the regulations now being enforced by the Mine Safety and Health Administration. These recommendations are also intended to assist the Bureau of Mines in evaluating the need for assisting mine operators in the areas of training and distribution of information related to material handling of trailing cables.

PB82-142571 PC **A11**/MF **A01**
Washington State Univ., Pullman. Dept. of Geology.
Manganese Nodule Resource Data, Sea Scope Expedition.
Open file rept. (Final) 1 Oct 79-19 Jun 81,
R. H. Fewkes, W. D. McFarland, and R. K. Sorem. 15 Jun 81, 230p BUMINES-OFR-144-81
Grant G0284008

New information on possible resource value of sea floor manganese nodule deposits in the eastern North Pacific has been obtained by a study of records and collections of the 1972 Sea Scope Expedition. Nodule abundance (percent of sea floor covered) varies greatly, according to photographs from eight stations and data from other sources. All estimates considered reliable are plotted on a map of the region. Similar maps show the average content of Ni, Cu, Mn, and Co at 89 stations from which three or more nodules were analyzed. Variations in nodule metal content at each station are shown graphically in an appendix, where data on nodule sizes are also given. Results of new analyses of 420 nodules from 93 stations for Mn, Fe, Ni, Cu, Co, and Zn are listed in another appendix. Relatively high Ni+Cu content is restricted chiefly to four groups of stations in the equatorial region, where group averages are 1.86, 1.99, 2.47, and 2.55 weight-percent.

PB82-142589 PC **A03**/MF **A01**
Scott and Fetzer Co., Cleveland, OH. Adalet-PLM Div.
Development of an Explosive Proof High Voltage Cable Connector.
Open file rept.
Feb 81, 33p BUMINES-OFR-149-81
Contract H0188068

Trailing cable splices made on location in underground mines are one of the weakest points of the cable run. There are safety advantages if these splices can be eliminated. The Bureau of Mines initiated this program to design and fabricate a proto-type coupler suitable for use on high voltage cables supplying power to Permissible mining machines. Work was recommended as result of USBM contract number 166069 and others.

PB82-143181 PC **A05**/MF **A01**
Michigan Univ., Ann Arbor. Cooley Electronics Lab.
Evaluation and Demonstration of a New Post-Disaster EM Communication Technique for Mines.
Open file rept. Oct 79-Sep 80,
M. P. Ristenbatt, and E. K. Holland-Moritz. Feb 81, 100p BUMINES-OFR-151-81
Contract J0199109

The objective of this report was to quantitatively compare an existing emergency mine communication system with a proposed automated system that features extended signal processing and a novel signal. A new postdisaster system, intended to use through-the-earth EM propagation, was demonstrated at input SNR of -34db. The system presently available requires an input SNR of +6 db, and uses a human ear detector. The present work demonstrated coherent integration for the automated system in multiples of 17 s, up to 1,088 s (18 minutes). A repeating pseudorandom (or pseudonoise) signal is used that offers an ideal autocorrelation at the receiver matched-filter output. A novel decision-variable algorithm achieves the estimate of noise level by using those matched-filter output samples that occur between the signal autocorrelation peaks.

PB82-143199 PC **A04**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Demonstration of a Dust Control System for Boom-Type Roadheader.
Open-file rept. Sep 79-Jul 81,
Mackenzie Burnett, Robert J. Pokora, and Terry Muldoon. Sep 81, 54p BUMINES-OFR-150-81
Contract J0199093

This program was initiated by the Bureau of Mines to quantify the respirable dust problem caused by the use of roadheaders in underground metal-nonmetal mines with special emphasis on this problem in uranium mines. The objective was to develop methods or equipment to alleviate respirable dust and to implement a solution in a mine. Attempts to quantify the dust problem were made by a survey of MSHA records, a survey of State nine enforcement agencies, a survey of mine records, and dust measurements taken at two mines using roadheaders. The results are not conclusive because of limited and sometimes less than useful data; however, the study does indicate that a serious dust problem could and may exist. The report discusses the available data concerning respirable dust problems and presents a solution that can potentially help to solve the problem. The solution requires the use of blowing ventilation, onboard dust extraction at the source, filtration, and continued continued use of water sprays.

PB82-145038 PC **A09**/MF **A01**
Dames and Moore, Park Ridge, IL.
Outcrop Barrier Design Guidelines for Appalachian Coal Mines.
Final rept. Jul 79-Feb 81,
Mary L. Pearson, Terje Preber, and Peter J. Conroy. 6 Feb 81, 177p 4624-021-07
Contract J0395069

The report contains summaries of existing legislation pertaining to outcrop barriers and a state-of-the-art survey of outcrop barrier designs and related mine closure techniques. Six sites were inspected in the field and are presented as case histories. The data analysis presented includes a computer modeled seepage analysis, an overburden blow-out analysis, and a wedge stability analysis. The results of these analyses are interpreted to form recommendations for coal outcrop barriers which will minimize seepage and the potential for failure. Supplementary support and reinforcement alternatives are also discussed.

PB82-145400 PC **A24**/MF **A01**
Bureau of Mines, Washington, DC.
List of Bureau of Mines Publications and Articles, January 1, 1975, to December 31, 1979 With Subject and Author Index,
Shelby Z. Palya. Nov 81, 574p BUMINES-SP-6-81
See also report for Jan-Dec 78, PB80-158603.

This publication lists and summarizes publications by Bureau authors published in the regular Bureau of Mines series, in scientific, technical, or trade journals, or in other media; those available from the Bureau of Mines are indicated. Patents issued to Bureau personnel are also listed, and instructions are given on how to apply for permission to use them. One of the outstanding features of this Special Publication is an exhaustive subject and author index.

PB82-145939 PC **A11**/MF **A01**
National Research Council, Washington, DC.
Surface Mining: Soil, Coal, and Society.
Jun 81, 248p ISBN-0-309-03140-0
Library of Congress catalog card no. 81-38419.

Two editorials drew attention to a number of the broad public policy issues that relate agriculture and energy. Important questions were raised concerning the massive expenditures for imported oil and the attempt to balance these foreign payments through the export of agricultural products; the high levels of soil erosion associated with current agricultural production; and the possibility that available agricultural land would be impaired by strip mining for coal. At the request of the U.S. Bureau of Mines, the National Academy of Sciences organized a task force, to explore these issues. The task force identified topics relevant to the uses and social values of land and soil in relation to surface mining for coal, ranging from basic soil geology and mining to optimization of resource management. The Bureau of Mines then commissioned this more detailed study of soil as a resource in relation to surface mining for coal. The committee divided into three working panels to explore the topics of: Soil Genesis, Mining and Reclamation, and Values and Choice. The panels augmented their membership where necessary in order to deal adequately with the problems before them. Using the documents and information gathered by the panels the committee developed this report.

PB82-147471 PC **A07**/MF **A01**
Booz-Allen and Hamilton, Inc., Cleveland, OH.

Demonstration of Coal Mine Illumination Systems.
Open file rept. (Final) Oct 77-Jun 80,
Anthony D. Szpak, William F. Hahn, and Charles S. Skinner. Jan 81, 127p BUMINES-OFR-2-82
Contract J0188006

The purpose of this program was to demonstrate the feasibility of illuminating various types of underground coal mining machinery as required by the Federal Coal Mine Illumination Standards Part 75.1719 to 75.1719-4 Code of Federal Regulations Title 30. Nine various machines were illuminated and the illumination systems were evaluated for a 3-month period. Factors evaluted were ease of implementation, reliability, ease of maintenance, acceptance by mine workers and operations, illumination degradation, and durability.

PB82-148420 PC **A02**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
A Program for Single-Phase Moderate-Temperature Geothermal Well Drawdown and Pumping Energy for the HP-97 and Other Desk Calculators.
Kwang Yu, and Roy Von Briesen. Nov 81, 18p JHU/APL/QM-81-138
Contract DE-A101-79ET27025

A desk calculator program was developed to provide a simple hydrologic model that could be used by those interested in the preliminary sizing of withdrawal rates and schedules for geothermal wells. The program has been of considerable use in JHU/APL Technical Assistance Projects along the Atlantic Coastal Plain. The program output is in the form of a listing that shows the incrementation years with the appropriate drawdown and the total pumping energy for each year.

PB82-803552 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Techniques Used in Ore Treatment Plants. August, 1979-July, 1980 (Citations from the Engineering Index Data Base).
Jan 82, 192p

Some of the treatments in worldwide research discussed are smelting, roasting, flotation, fluidized bed processing, sintering, ion exchange, magnetic separation, solvent extraction, crushing and grinding, pelletizing, and new alternatives. The bibliography also discusses pollution aspects, economics, supply and demand, waste utilization, performance, evaluation, equipment, energy aspects, and material recovery. (This updated bibliography contains 186 citations, none of which are new entries to the previous edition.)

PB82-803560 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Techniques Used in Ore Treatment Plants. August, 1980-November, 1981 (Citations from the Engineering Index Data Base).
Jan 82, 194p
Supersedes PB80-814056, and NTIS/PS-79/0899.

Some of the treatments in worldwide research discussed are smelting, roasting, flotation, fluidized bed processing, sintering, ion exchange, magnetic separation, solvent extraction, crushing and grinding, pelletizing, and new alternatives. The bibliography also discusses pollution aspects, economics, supply and demand, waste utilization, performance, evaluation, equipment, energy aspects, and material recovery. (This updated bibliography contains 189 citations, all of which are new entries to the previous edition.)

PB82-803784 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Petroleum Recovery: Reservoir Engineering and Recovery Methods. April, 1979-May, 1980 (Citations from the Engineering Index Data Base).
Jan 82, 219p
See also 1974-1975, NTIS/PS-77/0323, 1976-March, 1977, NTIS/PS-78/0278, April, 1977-February, 1978, NTIS/PS-79/0530, and March, 1978-79, PB80-812126.

Thermal recovery methods and well stimulation using waterflooding, steam injection, gas injection, and fluid injection techniques are discussed in this bibliography covering worldwide research. Topic areas cover fire flooding, caustic water flooding, miscible displacement, microemulsion flooding, polymer flooding, carbon dioxide miscible flooding, control of water mobility using polymers, and heat loss calculations. Reservoir modeling and simulation studies and studies pertaining to well logging, core analysis, and well perforation are included. A few abstracts discuss techniques of determining residual oil saturation, predicting oil recoverability, and monitoring the degree of flooding. (This updated bibliography contains 214 abstracts, all of which are new entries to the previous edition.)

PB82-803792 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Petroleum Recovery: Reservoir Engineering and Recovery Methods. June, 1980-November, 1981 (Citations from the Engineering Index Data Base).
Jan 82, 255p
Supersedes PB80-812134, and NTIS/PS-79/0531. See also 1974-1975, NTIS/PS-77/0232, 1976-March, 1977, NTIS/PS-78/0278, April, 1977-February, 1978, NTIS/PS-79/0530, and March, 1978-March, 1979, PB80-812126.

Thermal recovery methods and well stimulation using waterflooding, steam injection, gas injection, and fluid injection techniques are discussed in this bibliography covering worldwide research. Topic areas cover fire flooding, caustic water flooding, miscible displacement, microemulsion flooding, polymer flooding, carbon dioxide miscible flooding, control of water mobility using polymers, and heat loss calculations. Reservoir modeling and simulation studies and studies pertaining to well logging, core analysis, and well perforation are included. A few abstracts discuss techniques of determining residual oil saturation, predicting oil recoverability, and monitoring the degree of flooding. (This updated bibliography contains 250 citations, all of which are new entries to the previous edition.)

SAN-1747-T1 PC **A08**/MF **A01**
Equity Oil Co., Salt Lake City, UT.
BX In Situ Oil Shale Project. Annual Technical Progress Report, March 1, 1978-February 28, 1979 and Quarterly Technical Progress Report, December 1, 1978-February 28, 1979.
H. R. Jacobs. 20 Mar 79, 171p
Contract ET-78-F-03-1747

February 28, 1979 marks the end of the second year of work on the BX In Situ Oil Shale Project. Work accomplished during the year included the drilling and testing of all project injection and production wells; the installation and construction of project surface facilities; the installation and construction of laboratory research equipment; and the implementation of an environmental monitoring plan at the Project site. (ERA citation 05:008116)

SAN-2072-1(V.1) PC **A06**/MF **A01**
Gruy Federal, Inc., Arlington, VA.
Geothermal Direct Use, Economic and Engineering Study Integration. Volume I. Methodology and Results. Final Report.
C. A. Bakewell, N. Book, and E. H. Herron. Aug 79, 107p
Contract ET-78-C-03-2072

The technical approach to the problem of comparative evaluation of the twenty economic-engineering studies on non-electric uses of geothermal energy is described which led to the development of the Geodec model. The geodec model is presented and the analyses made and the results calculated are described. The conclusions and recommendations arising from these results are discussed. Included in appendices are sample data input/output forms for each of the modules which make up Geodec and the detailed input data and calculated results for each process analyzed. (ERA citation 05:015605)

SAN-2072-1(V.2) PC **A16**/MF **A01**
Gruy Federal, Inc., Arlington, VA.
Geothermal Direct Use, Economic and Engineering Study Integration. Volume II. Data Base. Final Report.
C. A. Bakewell, N. Book, and E. H. Herron. Aug 79, 375p
Contract ET-78-C-03-2072

Process analyses are presented including input and output data base for each of the twenty economic-engineering studies on non-electric uses of geothermal energy identified in Volume I. (ERA citation 05:015606)

SAN-79-1745C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Examination of Techniques for Thermally Efficient Delivery of Steam to Deep Reservoirs.
D. R. Johnson. 1980, 15p CONF-800411-1
Contract EY-76-C-04-0789
SPE/DOE symposium on improved oil recovery, Tulsa, OK, USA, 20 Apr 1980.

The thermal simulation test facility at General Electric/Tacoma has been utilized to successfully evaluate a variety of insulated injection strings in conjunction with state-of-the-art thermal packers. The test series has effectively demonstrated that the facility is capable of revealing a whole range of problems which may not be readily apparent from theoretical analysis or from laboratory bench testing. This series of tests has indicated a need for further development in virtually every area of the technology involved in the thermally efficient delivery of surface generated steam for economic recovery of heavy oil. This is especially true if the ultimate requirements of Project DEEP STEAM (700 exp 0 F, 3000 psi) are to be met. (ERA citation 05:014771)

SAND-79-2397 PC **A10**/MF **A01**
Sandia Labs., Albuquerque, NM.
Geothermal Drilling and Completion Technology Development Program. Semi-Annual Progress Report, April-September 1979.
S. G. Varnado. May 80, 222p
Contract AC04-76DP00789

The progress, status, and results of ongoing Research and Development (R and D) within the Geothermal Drilling and Completion Technology Development Program are described. The program emphasizes the development of geothermal drilling hardware, drilling fluids, and completion technology. Advanced drilling systems are also under development. The goals of the program are to develop the technology required to reduce well costs by 25% by 1982 and by 50% by 1986. (ERA citation 05:027179)

SAND-80-0591 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Gas Research Institute Improved Fracturing. Unconventional Natural Gas Program, Eastern Devonian Shales Diagnostic Program: Black No. 1 Well Experiment Results. Third Quarterly Report, October 1979-December 1979.
C. L. Schuster. Feb 80, 23p
Contract AC04-76DP00789

During the last quarter of 1979, Sandia National Laboratories participated in an experiment with Thurlow Weed and Associates and the Morgantown Energy Technology Center. This Devonian Shale gas stimulation experiment was conducted in an area north of Columbus, Ohio. One purpose of the experiment was to apply the diagnostic instrumentation that is available for fracture mapping and characterization to increase our understanding of the stimulation technique. The induced fracture apparently followed a pre-existing fracture vertically from the borehole with an orientation of the N 62 exp 0 E and in the latter stages of the stimulation turned into a shallower horizontal fracture. This fracture behavior was confirmed by several diagnostic analyses and demonstrates the insight that can be gained by fully instrumented stimulation experiments. (ERA citation 05:037646)

SAND-80-0847C PC **A02**/MF **A01**
Department of Energy, Laramie, WY. Laramie Energy Research Center.
Results of the Fourth Hanna Field Test.
J. R. Covell, L. F. Wojdac, F. A. Barbour, G. W. Gardner, and R. Glass. 1980, 18p CONF-800716-13
Contract AC04-76DP00789
Underground coal conversion symposium, Afton, OK, USA, 13 Jul 1980.

The second phase (Hanna IVB) of a coal gasification experiment near Hanna, Wyoming, was completed in September 1979. The experiment attempted to link and gasify coal between process wells spaced 34.3 meters apart. Intermediate wells were positioned between the process wells so that the link could be relayed over shorter distances. Reverse combustion linking was attempted over a 22.9-meter and a 11.4-meter distance of the total well spacing. Thermal activity was generally noted in the upper 3 meters of the coal seam during the link. Two attempts to gasify over the 34.3-meter distance resulted in the propagation of the burn front at the coal overburden interface. Postburn evaluation indicates fractures as major influencing factors of the combustion process. The Hanna IVB

field test provided much insight into influence that geologic features have on in situ coal combustion. The influence of these faults, permeable zones, and cleats, on the air flow patterns can drastically change the overall results of a gasification experiment and should be studied further. The overall results of Hanna IVB were discouraging because of the rapid decline in the heating values for the production gas and the amount of coal gasified. With more complete geologic characerization prior to experimentation and proper well completions, it is believed that most of the subsurface operational problems encountered during Hanna IV could have been avoided. (ERA citation 05:030104)

SAND-80-1292 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Application of Statistical Estimation Theory to the Determination of Porosity and Residual Oil Saturation.
W. D. Lyle, and S. W. Eisenhawer. Aug 80, 63p
Contract AC04-76DP00789

Several distinct techniques exist for obtaining independent measurements of porosity and residual oil saturation. This paper derives an algorithm for combining any number of such independent measurements of either of these parameters into a single measurement or estimate. The estimate so obtained is shown to have a deviation from the true parameter value that is less than the deviation of the best of the individual estimates. In deriving this estimate an analysis is made of the errors associated with porosity measurements obtained from core analysis, formation density logs, and neutron logs, and errors associated with pulsed neutron capture logs and nuclear magnetism logs for saturation measurements. This analysis yields the probability density functions of the errors in a general form that is applicable to a wider range of measurements than those considered in this paper. Finally, a complete statistical analysis is made of the errors associated with saturation measurements using resistivity logs and the probability density function of the measurements is obtained. The mean and variance of these measurements are expressed in terms of parabolic cylinder functions and close approximations to the exact mean and variance are obtained. (ERA citation 05:033249)

UCRL-15234 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Metallurgical and Mineral Engineering.
Effect of Principal Stress Magnitudes on Hydrofracturing Orientation.
B. C. Haimson. Dec 79, 7p
Contract W-7405-ENG-48

The emphasis during the reported period of the project was on the effect of borehole fluid viscosity on hydrofracturing results. To carry out these tests we used different hydraulic oils of known viscosities under a preset state of stress. Two conditions were investigated: one in which the largest horizontal compressive stress (sigma/sub H/) was only slightly larger than the least horizontal stress (sigma/sub h/), and both were considerably smaller than the vertical stress (sigma/sub V/), and another in which sigma/sub V/ was substantially less than either sigma/sub H/ or sigma/sub h/. (ERA citation 05:024791)

UCRL-50026-80-3 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
LLNL Underground Coal Gasification Project. Quarterly Progress Report, July-Sep 1980.
D. U. Olness. 14 Oct 80, 28p
Contract W-7405-ENG-48

Laboratory studies of forward gasification through drilled holes in blocks of coal have continued. Such studies give insight into cavity growth mechanisms and particulate production. In addition to obtaining a qualitative comparison of the forward burn characteristics of two coals, we obtained information on the influence of bedding plane/cleat structure orientation on the early-time shape of the burn cavity in the Roland coal. We have improved our model of the coal drying rate during underground coal gasification (UCG) by adding refinements to the model. To aid in analyzing and predicting the performance of UCG tests, we have developed a simple gas-compositional model. When the model was tested against experimental data from the three Hoe Creek experiments, it was able to match very closely the observed gas compositions, energy fractions, and water influxes. This model can be used to make performance predictions consistent with the material and energy balance constraints of the underground system. A postburn coring and wireline-logging study is under way at the Hoe Creek No. 3 site to investigate the overall effect of the directionally-drilled, horizontal linking hole to better estimate the amount of coal gasified and the shape of the combustion front, and to provide additional information on subsurface deformation and thermal effects. The site reclamation work was completed, including the dismantling of all surface equipment and piping and the plugging and sealing of process and diagnostics wells. Final grading of the reclaimed land has been completed, and the area is ready for disk-seeding. Our survey of the UCG literature has continued with a review of the extensive tests at Gorgas, Alabama, carried on by the US Bureau of Mines from 1947 to 1959. (ERA citation 06:006853)

UCRL-52930 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Solar Retorting of Oil Shale.
D. W. Gregg, R. W. Taylor, J. Z. Grens, W. R. Aiman, and L. E. Marsh. 15 May 80, 40p
Contract W-7405-ENG-48

First, in an overview, we outline and discuss the potential applications of solar energy to the production of fuels. We show that, starting from a fossil feedstock, there are four areas in which solar energy can have a major impact in the production of fuels: in solar retorting of oil shale, in solar coal gasification, in solar steam flooding of oil fields, and in solar steam-reforming of methane. We performed a detailed technical and economic analysis of solar retorting of oil shale. The analysis shows that this solar process not only should be technically feasible but also should improve the fuel yield from the oil-shale feedstock by 10 to 40%, depending on the grade of the shale, compared to the most efficient competing (nonsolar) process. The improved oil yield should more than pay for the incremental cost associated with adding the solar collection system (field of focusing heliostats). The results from an experiment in which solar energy was used to retort oil shale show that yields of better than 110% Fischer Assay are achievable. An advanced design for a solar oil-shale retort is also presented. (ERA citation 06:004539)

8J. Physical Oceanography

AD-A108 212/2 PC **A04**/MF **A01**
Science Applications, Inc., McLean, VA.
Statistical Modeling of Shear in the Upper Ocean.
Technical rept. 11 Jan 80-24 Mar 81,
Gerald T. Hebenstreit, and Walter J. Grabowski. 1 Mar 81, 75p Rept no. SAI-82-382-WA
Contract N00014-81-C-0084

Analysis of upper ocean shear profiles obtained with a free-fall sampling instrument (YVETTE) indicated that, within specific depth regimes and for specified vertical differencing intervals, values of shear-squared might be distributed according to a chi squared probability distribution. An analysis based on several assumptions about the shear field produced a model which showed that a chi squared distribution was physically reasonable. Statistical tests on the profiles led to acceptance of the hypothesis that S squared follows a chi squared distribution with a variance derived from the mean-squared shear in the regime. Further statistical tests showed that the necessary assumptions about the horizontal shear components were statistically reasonable as well as physically reasonable. A trial prediction using a simple linear relationship between mean Brunt-Vaisala frequency in a regime and mean shear-squared, based on a 2m separation, in the regime showed the chi squared model to be a potentially useful tool for area characterizations.

AD-A108 320/3 Not available NTIS
Scripps Institution of Oceanography, La Jolla, CA.
Electromagnetic Active Source Sounding Near the East Pacific Rise,
Peter D. Young, and Charles S. Cox. 14 May 81, 4p
Availability: Pub. in Geophysical Research Letters, v8 n10 p1043-1046 Oct 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A108 412/8 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Agents of Low Temperature Ocean Crust Alteration.
Journal article,
Hubert Staudigel, Karlis Muehlenbachs, Stephen H. Richardson, and Stanley R. Hart. 2 Mar 81, 9p Rept no. LDGO-3199
Contract N00014-75-C-0291
Pub. in Contributions to Mineralogy and Petrology, v77 p150-157 1981.

No abstract available.

N82-13643/3 PC **A03**/MF **A01**
Stockholm Univ. (Sweden). Meteorologiska Institutionen.
On the Inadequacy of One Dimensional Ocean Models for the Global Carbon Cycle.
A. Bjoerkstroem. 18 Feb 81, 29p CM-51

An attempt is made to estimate the free parameters in a model of the oceanic carbon cycle, using GEOSECS data. It turns out to be impossible to set the parameters in a way that is compatible with the observed distributions of carbon and oxygen simultaneously. The result indicates that it may not be possible for any horizontally homogeneous ocean model to depict the carbon cycle in a satisfactory way. A model where Antarctic water is treated separately is required.

PB82-861394 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sea Ice. 1975-January, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 82.
Jan 82, 194p

Citations in this bibliography cover observations and measurements of the properties, movement, and distribution or location of sea ice and sea ice meltwater. Age delineation and dynamic seasonal response of sea ice are considered as well as its paleoclimatic and recent climatic significance. Coverage is worldwide, with much attention focused upon polar regions. (Contains 173 citations fully indexed and includes a title list.)

8K. Seismology

AD-A108 501/8 PC **A03**/MF **A01**
Radiomana, Paris (France).
Seismic Crustal and Subcrustal Phases Propagation. Attenuation of Local Phases in Western Europe.
Annual rept. 1 Dec 80-30 Sep 81,
P. Mechler, M. Nicolas, B. Massinon, and M. Bouchon. 30 Oct 81, 32p AFOSR-TR-81-0784
Grant AFOSR-80-0082, ARPA Order-3291

The purpose of this study is to evaluate attenuation of local seismic phases in France. Using a set of six earthquakes which occurred in France or in its vicinity, the short period data recorded by a homogeneous seismic network (vertical component) have been used, within a range of epicenter to station paths of 1 deg to 10 deg. Global attenuation versus distance has been determined for each phase Pn, Sn, Pg and Lg and the influence of frequency analysed. For Pn and Sn waves they are of the order of 2, and slightly higher for Pg (2.3) and Lg (2.5) waves. But the amplitude of these waves is largely dependent on the azimuth of propagation. Lg/Pg ratios present a large scatter between 1 and 10 with a mean trend around 3 to 4. We found that the Lg anelastic factor is of the order of 1/0.2 deg at 1Hz, a result to be compared with the values of 1/0.7 deg (Eastern US), 1/0.15 deg. and 1/0.35 deg (respectively Northern USSR and South Caspian Sea). The quality factor, computed for each of these local phases, shows a clear dependence on frequency, increasing from some 100 at 1Hz to some 1000 at 10 Hz probably due to scattering effects.

AD-A108 505/9 PC **A07**/MF **A01**
California Inst. of Tech., Pasadena. Seismological Lab.
Body and Surface Wave Modeling of Observed Seismic Events.
Semi-annual technical rept. 1 Nov 80-30 Apr 81,

David G. Harkrider, and Donald V. Helmberger. 30 Apr 81, 136p AFOSR-TR-81-0786
Contract F49620-81-C-0008, ARPA Order-3291

This research can be divided into three main topics, coupling of surface waves generated in laterally inhomogeneous source regions to teleseismic propagation paths, the use of long linear arrays to separate and interpret Lg waves in terms of higher mode surface waves, and the use of short and long period teleseismic body waves in determining the character of seismic sources.

AD-A108 613/1 PC **A03**/MF **A01**
Teledyne Geotech, Alexandria, VA. Seismic Data Analysis Center.
Seismic Data Analysis Center. Final Report.
Technical rept. 1 Oct 77-15 Dec 78,
Robert R. Blandford. 11 Dec 79, 45p SDAC-TR-79-7, VSC-TR-81-23
Contract F08606-78-C-0007, DARPA Order-2551

This report provides information and statistics concerning the operation and maintenance of the computer systems at the SDAC, a consideration of the abstracts from the technical reports resulting from studies and seismic research, and a summary of the work accomplished to expand the computer systems and programs used for the VELA Network.

AD-A108 615/6 PC **A10**/MF **A01**
California Univ., Berkeley. Dept. of Geology and Geophysics.
State-of-the-Art for Assessing Earthquake Hazards in the United States. Report 17. Interpretation of Strong Ground Motion Records.
Miscellaneous papers,
Bruce A. Bolt. Oct 81, 219p WES-MP-S-73-1-17
Contract DACW39-78-C-0061

In attempts to extend the usual seismological analyses of seismograms to strong-motion records. A description is given of the main patterns of motions recorded on accelerograms near to the causative fault in terms of P and S waves and Love and Rayleigh waves. In order to achieve this, the effects of source dimensions and the physical and kinematic properties of the fault zone are included in the analysis. The two main aims of the work were, first, to make an initial step toward the routine interpretation of the recorded strong ground motions and, as a consequence, to provide a basis which would allow ground motions in future large earthquakes to be predicted. Both aspects of strong - motion seismology are of interest to the engineering profession for the design of critical structures in earthquake country. The research has been based on the detailed study of near-field records obtained in moderate to large earthquakes in the last few decades. In particular, analysis is made of strong-motion records of 10 important earthquakes that includes: the 1952 Kern County, CA, earthquake; the 1971 San Fernando, CA, earthquake; the 1972 Managua, Nicaragua, earthquake; the 1977 Romania earthquake; the 1979 Imperial Valley, CA, earthquake; and the 1980 Livermore Valley, CA, earthquake. The analysis works from first physical principles and, so far as possible, uses elementary ray theory and kinematic arguments. Nevertheless, elements of the more sophisticated theory of earthquake mechanisms and seismic wave propagation in the near field were taken into account in the interpretative work.

N82-13604/5 PC **A13**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
International Seismological Data Center. Input Data for an Experimental Data Base.
G. Barkeby. Nov 80, 289p FOA-C-20380-T1

Temporary international seismological data center facilities were set up at Hagfors Laboratory, (1) to demonstrate one way of carrying out the main tasks of a global monitoring system which would be necessary to verify an international test ban treaty and (2) to facilitate experimental studies into the technical and scientific details of the functions which would be performed by such a center. The facilities include the compilation of an experimental data base. The input part of data base is listed together with information on the use of the observations in automatic analysis, either defining, or being associated with, events. The available parameters are divided into those obtained from short period and from long period instruments.

UCRL-15221 PC **A03**/MF **A01**
Teledyne Geotech, Alexandria, VA.
Seismicity of the Salt Areas of Texas, Louisiana, Oklahoma and Kansas.
D. Racine, and P. Klouda. Feb 80, 29p
Contract W-7405-ENG-26

The results of a seismicity study of the salt deposit areas of Kansas, Oklahoma, Texas and Louisiana are presented. The study was conducted using some of the short-period seismic data recorded on film at the Wichita Mountain Observatory (WMSO), located in southern Oklahoma, during the years 1961 through 1968. Only data recorded on Sundays were analyzed to minimize the confusion of quarry blasts. All major quarries within 400 km of WMSO were located and some of the known blasts were studied for distinguishing characteristics. Inquiries were made to the appropriate state agencies for data to produce a list of historical seismic events which occurred during the 1961 to 1968 period. A salt deposit composite map of the areas was also produced and all historical and previously unreported events, as well as the known quarries, were plotted on this base map. (ERA citation 05:024785)

8L. Snow, Ice, and Permafrost

AD-A108 304/7 PC **A03**/MF **A01**
San Diego Natural History Museum, CA.
Water-Column Studies near a Melting Arctic Iceberg.
Eric Shulenberger. Dec 81, 41p
Contract N00014-78-C-0679

Glacial icebergs contain large amounts of nitrate, an important phytoplankton nutrient. Low density iceberg meltwater, in rising, mixes with euphotic zone water nearby, wherein NO3 is in low concentration. Rising meltwater may also entrain nutrient-rich deeper waters and raise them to sunlit depths. Sixteen vertical profiles of nutrients (PO4, NO3, SiO2), chlorophyll-a, and physical parameters were taken near a Greenland iceberg at approx. 50 deg. N, 50 deg. W in May-June 1980. Chlorophyll profiles show very pronounced maxima at or just below the maximum rate of change of water density vs. depth; profile forms are heterogeneous (no 'typical' form is evident). No enhancement of chlorophyll concentration was found re distance from or direction to the iceberg. Effects of mixing on NO 3 concentrations are marginally detectable, but no 'wake' or 'downwind' effects were observed. The iceberg does not appear to grossly perturb water column plant biology nearby, but measures of rates of productivity might show otherwise, particularly near larger (e.g. Antarctic) icebergs. (Author)

AD-A108 343/5 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Shallow Snow Model for Predicting Vehicle Performance,
William L. Harrison. Oct 81, 25p Rept no. CRREL-81-20

A historical review of research is presented to establish the state-of-the-art for analyzing the behavior of vehicles in shallow snow. From this review, the most comprehensive and promising model is put together to establish a first-cut performance prediction model for vehicles operating in shallow snow, slush, ice and thawing soils. (Author)

PB82-148180 PC **A04**/MF **A01**
World Data Center A for Glaciology, Boulder, CO.
Glaciology in China,
Ann M. Brennan. May 81, 75p GD-10, NOAA-81080504

To familiarize western scientists with current areas of Chinese activity in glaciology, and to identify older sources of information that may still be relevant, the Data Center invited Ms. Jane Bradley to prepare a bibliography of publications on glaciological studies in China and Tibet during her recent stay in Cambridge, England. This issue contains the results of her work in the libraries there and also a report prepared by Dr. Troy Pewe on glaciological research in China.

8M. Soil Mechanics

AD-A108 269/2 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Site Investigations and Submarine Soil Mechanics in Polar Regions.
Special rept.,
Edwin J. Chamberlain. Oct 81, 20p Rept no. CRREL-SR-81-24

Placing oil exploration and production structures offshore in the Alaskan Beaufort Sea will require careful site investigation and evaluation of submarine soil mechanics. Ice-bonded permafrost occurs widely under the Beaufort Sea floor. Its engineering properties are important to the design of offshore structures. Highly overconsolidated clays also occur widely and interfere with access to gravels for constructing artificial islands. Sites should be selected to avoid ice-rich permafrost. Laboratory tests may need to be conducted to determine the potential hazards of thaw consolidation and weakening. (Author)

AD-A108 318/7 PC **A07**/MF **A01**
Mississippi Agricultural Experiment Station, State College.
Vegetative Erosion Control Studies Tennessee-Tombigbee Waterway.
Final rept. 3 Aug 76-30 Oct 80,
Jeffrey V. Krans, Clifford Trammel, Richard Harrod, and Veronica Henning. Jan 81, 139p
Contract DACW62-76-C-0216

Vegetative erosion control studies of establishment, overseeding, and refertilization were conducted at two sites in Tishomingo CO., MS (Yellow Creek Port Site and Tennessee-Tombigbee Waterway Site) that were most representative of the Tenn-Tom Waterway slopes and spoil areas from August, 1976 thru October 1980. Primary objectives were focused on species selection, seeding rates, mulch evaluations, post-establishment fertilization and overseeding. Species shown to be well adaptive to site and soil conditions were weeping lovegrass, tall fescue, rye, annual ryegrass, bahiagrass, sericea lespedeza, and crimson clover; common bermudagrass and hairy vetch showed moderate adaptation. Comparison of seeding rates, mixtures, and seed distribution methods of either mixed or contour seeding were evaluated as well as straw-asphalt seed mulch and nylon-paper webbing mulch. Overseeding was performed to integrate plant species into or increase the density of an established vegetative stand. Cultivation practices of burning, discing, and clod-busting were evaluated with clod-busting being the most effective method. Refertilization with nitrogen was evaluated as a short term maintenance practice to maintain slope stabilization prior to overseeding. Regrowth of the established stand following overseeding was greater with prior nitrogen fertilization. Plant response to nitrogen fertilization (80 lbs N/acre) lasted two years. (Author)

AD-A108 518/2 PC **A08**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Investigation of Compaction Criteria for Airport Pavement Subgrade Soils.
Final rept. Mar 78-Apr 81,
William N. Brabston. Oct 81, 174p WES/TR/GL-81-11, FAA/RD-81/48
Contract DOT-FA78WAI-876

A study was conducted to determine the effect of lowering soil density requirements for subgrades under airport pavements. The investigation was primarily a laboratory effort in which molded specimens of three different soil types, compacted to densities at and below those currently specified by FAA criteria, were subjected to repeated axial loadings in a triaxial compression chamber. The primary response parameters of interest were permanent and resilient axial strain. Test results were formulated into a statistical model to predict permanent soil strain based on soil characteristics such as density, clay content, compaction characteristics, and sheer strength. The strain model was used to calculate values of permanent soil deformation at the surface of the subgrade for various combinations of soil density. Results of the test indicated that the wide variation in soil response among the three materials tested precluded any general alteration in current FAA compaction criteria. (Author)

AD-A108 743/6 PC **A06**/MF **A01**
R and D Associates, Marina del Rey, CA.
Soil Properties of USSR Strategic Areas. Volume I. Soil Property Comparisons for Selected USSR and U.S. Soils.
Topical rept. 5 Jan-1 Dec 80,
Deane Oberste-Lehn. 1 Dec 80, 113p RDA-TR-113206-003-VOL-1, DNA-5701T-1
Contract DNA001-80-C-0069

Soils of USSR strategic areas and the MIDDLE GUST test site were compared to evaluate the validity of using MIDDLE GUST geology as representative of radiation energy absorption for USSR strategic areas. Average Z values were calculated for the USSR and MIDDLE GUST soils using weight and adjusted volumetric methods. Results indicate that porosity and pore water content cause greater variation in the average Z values of these soils than does the mineralogic component, and that method of calculation causes significant differences. To verify the validity of using the MIDDLE GUST test site for radiation energy absorption calculations of USSR strategic areas, it is recommended that the computer codes use the volumetric (not weight) calculation method and that the vegetation in the USSR areas be assessed for its effect on energy coupling into the ground. (Author)

N82-13470/1 PC **A03**/MF **A01**
Environmental Research and Technology, Inc., Concord, MA.
Analysis of Soil Moisture Extraction Algorithm Using Data from Aircraft Experiments.
Final Report.
H. H. K. Burke and J. H. Ho. Jun 81, 37p NASA-CR-166719, P-A826
Contract NAS5-26361

A soil moisture extraction algorithm is developed using a statistical parameter inversion method. Data sets from two aircraft experiments are utilized for the test. Multifrequency microwave radiometric data surface temperature, and soil moisture information are contained in the data sets. The surface and near surface (or = 5 cm) soil moisture content can be extracted with accuracy of approximately 5% to 6% for bare fields and fields with grass cover by using L, C, and X band radiometer data. This technique is used for handling large amounts of remote sensing data from space.

PB82-147893 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
An Explicit Solution for the Green Functions for Dynamic Loads in Layered Media.
Research rept.,
Eduardo Kausel. May 81, 83p R81-13, NSF/CEE-81060
Grant NSF-PFR80-12338

Solutions to elastodynamic problems of continua subjected to static and dynamic loads are reviewed and their value as tools is emphasized in solving involved boundary value problems arising in seismology and geomechanics. Ways to determine the response of a soil deposit to dynamic loads, caused either by a seismic excitation or by prescribed forces at some location in the soil mass, are discussed. That the loads must be resolved in terms of their temporal and spatial Fourier transforms is stressed. The stiffness matrix approach, an alternative method of analysis for layered soils, is explained. Green functions for ring loads, disk loads, point loads, and internal stresses are given. The Green functions for an arbitrarily layered stratum are evaluated by means of a computer program. An explicit, closed-form solution for the Green functions is presented. The solution is based on a discretization of the medium in the direction of layering, which results in a formulation yielding algebraic expressions whose integral transforms can be readily evaluated.

SAND-80-0693C PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
In-Situ Determination of Strength Parameters of Marine Soils.
R. L. McNeill, and S. L. Green. 1980, 28p CONF-800618-1
Contract EY-76-C-04-0789
ASTM symposium on shear strength of soils, Chicago, IL, USA, 27 Jun 1980.

Principles are developed whereby both the sear strength, S, and the effective soil strength angle, phi', can be calculated from the readings of a combined shear/normal-stress gauge mounted on the face of a rough penetrator. The method calculates S and phi' even if interface friction is the mechanism of failure, unless that friction is local to the gauge face. In that case, the method yields only the interface friction angle, delta. (ERA citation 05:022825)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A108 140/5 PC **A07**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Influence of Contact Conditions and the Circuit on Short Negative Differential Mobility Semiconducting Devices.
Final rept.,
H. L. Grubin. 3 Aug 81, 132p
Contract N00014-78-C-0269
Report on the Physics and Operation of Multi-Terminal Near- and Sub-Micron Length, Hot Electron Semiconductor Devices. Prepared in cooperation with Scientific Research Associated, Inc., Glastonbury, CT.

During the last two or three years we have seen a remarkable resurgence of interest in the physics of nonlinear semiconductor devices and transport. While there are probably as many reasons for this development as there are practitioners, we can group them into several categories. First there are the anticipated fruits of the VLSI and VHSIC programs. These programs are geared primarily to the development of conventionally conceived devices fabricated on a submicron scale, and provide the primary motivation for all other submicron programs. While the VLSI and VHSIC development will provide new, important military and commercial gains, its potential accomplishments are limited by our present understanding of semiconductor device physics. Most devices fabricated as part of this program use design tools generated by semiclassical transport, the best known being the mobility concept where the carriers respond instantaneously to changes in electric field. The inadequacy of the mobility concept for submicron length high speed devices was raised implicitly by Butcher and Hearn in 1968, and Rees in 1969; and explicitly by Ruch in 1972 in his well-known paper on velocity overshoot. Indeed, Ruch's paper was a watershed for device transport studies insofar as it focused attention on the transient dynamics of carrier transport and showed that the response of the carrier velocity to a sudden change in field was considerably different from that associated with mobility models.

AD-A108 266/8 PC **A04**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Measured Pulse Transfer Characteristics of High Impedance Microstrip Lines.
Final rept. Mar 79-Mar 80,
David G. McLaine. Apr 81, 58p Rept no. AFWAL-TR-80-1160

Theoretical and experimental results of the propagation and coupling characteristics of fast risetime (50-150 ps) digital pulses on high impedance (100 ohm) microstrip lines are presented. Theoretical microstrip design equations are discussed and the significance of dispersion analyzed. Five mil lines on 35 mil alumina substrates were fabricated using standard thick film technology. Various line lengths, coupled line lengths, and coupled line spacings were analyzed to determine pulse degradation effects and the coupling coefficients between lines. (Author)

AD-A108 396/3 PC **A04**/MF **A01**
Hughes Aircraft Co., Torrance, CA. Torrance Research Center.
Reliability Investigation of Low Noise GaAs FETs.
Final technical rept. 31 Aug 78-31 Aug 80,
Lawrence S. Bowman, and W. Tarn. Jul 81, 67p
HAC-W-43413, RADC-TR-81-181
Contract F30602-78-C-0295

The objective of this program is to assess the reliability and operating life characteristics of low noise, small signal, microwave, n-channel, gallium arsenide (GaAs), metal epitaxial semiconductor field effect transistors (MESFETs) with a Schottky-barrier gate, and to identify associated failure mechanisms with notice to the supplier that the devices would be used in a testing program sponsored by the Department of Defense and that results would be reported to the Government. The FETs obtained represented a broad cross section of currently available devices, and included both gold-based and aluminum gate metallizations with gate lengths nominally from 0.5 microns to 1.2 microns.

AD-A108 550/5 PC **A07**/MF **A01**
Dayton Univ., OH.
High Speed Permanent Magnet Generator Material Investigations--Rare Earth Magnets.
Final rept. 1 Jun 79-2 Apr 81,
Herbert F. Mildrum, and George A. Graves, Jr. Oct 81, 140p UDR-TR-81-105, AFWAL-TR-81-2096
Contract F33615-79-C-2010

Permanent magnets with room-temperature energy products of approximately equal to 20-30 MGOe were characterized with a view toward their use in airborne electrical machinery. This report presents the results of an evaluation of commercial sintered rare earth-transition metal magnets potentially suitable for such applications. They include SmCo5, (SmPr)Co5, and modified Sm2Co17, produced by 11 companies worldwide. Extensive magnetic, physical, mechanical, and electrical property engineering data, based on statistically significant numbers of test magnets for each measurement, are presented. Testing procedures, range of evaluation, and test considerations relevant to the application are also identified. (Author)

AD-A108 556/2 PC **A04**/MF **A01**
Varian Associates, Inc., Palo Alto, CA. Solid State Lab.
Submicron FETs Using Molecular Beam Epitaxy.
Final rept. Aug 77-Sep 81,
S. Bandy, Y. Chai, R. Chow, T. Gibbs, and C. Hooper. Oct 81, 53p
Contract N00014-77-C-0655

Using electron-beam exposure and MBE GaAs, FETs have been fabricated with gate lengths of around 0.25 micron. A noise figure of 1.1 dB with an associated gain of 14 dB has been measured at 8 GHz. A new technique to increase the gate cross-sectional area by employing a mushroom gate profile reduced the gate resistance by about a factor of six, but this dramatic reduction in input resistance resulted in only 0.2-0.3 dB improvement in the measured minimum noise figure. Because of this, it is felt that there is a problem of matching such a high Q input with the rather lossy microstrip technique used, resulting in an inaccurate measurement of the noise figure. (Author)

AD-A108 745/1 PC **A04**/MF **A01**
Michigan Univ., Ann Arbor. Electron Physics Lab.
GaAs FET Device Modeling and Performance.
Interim technical rept. Feb 79-Feb 81,
J. R. East, and G. I. Haddad. Nov 81, 65p TR-152, AFWAL-TR-81-1191
Contract F33615-77-C-1132

This technical report contains a description of a quasi-two-dimensional model for GaAs FET operation. The model is based on modified expressions for the carrier continuity and Poisson equations in the conducting channel of an FET. The model is compared to full two-dimensional results to determine its accuracy. It is then used to study a variety of operating conditions. The effect of various material and device parameters are also discussed. (Author)

DOE/ET/29355-T1 PC **A08**/MF **A01**
Aluminum Co. of America, Alcoa Center, PA. Alcoa Technical Center.

Group 9A—Components

Performance of a Technical and Economical Feasibility Study of an HVDC Compressed Gas Insulated Transmission Line. Third Quarterly Progress Report, April 1-June 30, 1980.
R. L. La Barge. 1980, 157p
Contract AC01-79ET29355

HVDC commissioning procedures have been successfully demonstrated with model cables. Particles of all types and in large numbers never found in a practical cable are placed in the middle of the model cable at the beginning but are trapped at the end of the commissioning procedure. The concepts of protecting the insulators have been successfully realized. Small particles are confined in the lower half of the cable and bounced into traps in the bulge. Large particles invading the top half of the cable are captured hovering around the ends and along the lower edge of the expansion-joint shield. None of the particles can contaminate the insulators. The simulation of the particle path was done with a microcomputer. The very simple simulation model predicts the effect of the enclosure profile and agrees with test observations. Both test observations and the simulations lead to the expectation that a successful HVDC commissioning procedure can be applied to the total length of an installed cable. Overvoltages within the cable due to lightning surges were analyzed. The most severe switching overvoltages were analyzed previously. A 1300 kV BIL and a 1050 kV BSIL are independently shown to be feasible. Lower BIL and BSIL could be feasible if the improvement of arrester technology is projected for longer term and/or if more elaborate protection schemes are introduced. Thermal expansion of the insulator was shown to be compatible with the metal inserts. As-cast conductors can be used to achieve equal, if not better, utilization of the gas dielectric strength with respect to lightning impulse. Other types of voltage are still to be assessed. (ERA citation 06:010871)

N82-13356/2 PC **A04**/MF **A01**
Santa Barbara Research Center, Goleta, CA.
Advanced Indium Antimonide Monolithic Charge Coupled Infrared Imaging Arrays.
Final Report.
T. L. Koch, C. A. Merilainen, and R. D. Thom. Nov 81, 66p NASA-CR-165799
Contract NAS1-16383

The continued process development of SiO2 insulators for use in advanced InSb monolithic charge coupled infrared imaging arrays is described. Specific investigations into the use of plasma enhanced chemical vapor deposited (PECVD) SiO2 as a gate insulator for InSb charge coupled devices is discussed, as are investigations of other chemical vapor deposited SiO2 materials.

PAT-APPL-6-315 850 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Method of Measuring the Thermal Properties of a Resonator.
Patent Application,
John R. Vig. Filed 28 Oct 81, 11p AD-D009 049/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The thermal properties of a crystal resonator are rapidly and inexpensively measured by first immersing the resonator into an ice water bath at 0 C and monitoring the frequency of the resonator until the frequency of the resonator is no longer changing; then rapidly immersing the resonator into a boiling water bath at 100 C and monitoring the frequency versus time characteristics of the resonator at least until the frequency of the resonator is no longer changing; repeating the above cycle, and determining the thermal properties of the crystal resonator from the frequency versus time characteristic. (Author)

PAT-APPL-6-323 858 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Planar Doped Barrier Gate Field Effect Transistor.
Patent Application,
Roger J. Malik, and Thomas R. AuCoin. Filed 23 Nov 81, 11p AD-D009 048/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Disclosed is an epilayer field effect transitor having a planar doped barrier gate formed on an n-type semiconductor planar channeel region intermittent drain and source terminals formed on the surface of the channel region. The semiconductor channel region is fabricated on a semiconductor substrate, preferably GaAs and being separated therefrom by one or more semiconductor planar buffer regions. The planar doped barrier gate comprises an n+ - pi - p(+) - pi structure grown by molecular beam epitaxy over the n-type channel region. Application of an electrical potential to the gate modulates the channel charge depletion in the semiconductor channel region underlying the gate causing a variation in the channel conductance laterally between the source and drain terminals. (Author)

PB82-134354 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC.
Technical Assistance for Future Insulation Systems Research, 1980.
Annual rept.,
R. J. Van Brunt, M. Misakian, D. A. Leep, K. J. Moy, and E. C. Beaty. Apr 81, 106p NBSIR-81-2242
Sponsored in part by Department of Energy, Washington, DC.

An experimental technique has been developed to quantify the electrical characteristics of pulse-type partial discharges (corona) in compressed electronegative gases. By this method the pulse repetition rates, shapes, and height distributions are determined together with the average current. The technique has been applied to the investigation of corona behavior in compressed SF6 and SF6/N2 for both dc and 60-Hz ac voltages. A gas chromatograph-mass spectrometer has been employed to monitor production of trace contaminants by corona-induced degradation of SF6. The most abundant gaseous by-products that were detected from dc corona were H2O, SOF2, and SO2F2.

PB82-135187 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC.
Corrosion Evaluation of Underground Telep':one Cable Shielding Materials.
Progress rept. 1976-80,
W. F. Gerhold, and J. L. Fink. Apr 81, 77p NBSIR-81-2243
See also report for 1976, PB-258 227. Sponsored in part by Department of Agriculture, Washington, DC.

Corrosion data is given on the performance of base and plastic coated metals intended for use as cable shields for buried telephone cable. The materials investigated on specially prepared specimens were buried for periods up to six years in six dfferent soil environments. Metals tested included homogeneous plastic-bonded and metallurgically-bonded laminates. Some specimens were exposed bare (uncoated), while others had plastic coatings or other types of coatings on either one or both sides. Metals studied included aluminum, copper, low carbon steel and stainless steel alloys.

PB82-140831 Not available NTIS
National Bureau of Standards, Washington, DC.
Structural Materials for Large Superconducting Magnets.
Final rept.,
F. R. Fickett, and H. I. McHenry. Sep 81, 8p
Pub. in Proceedings of International Conference Magnet Technology (7th), Karlsruhe, Germany, F.R., March 30-April 5, 1981, IEEE Trans. Mag. MAG-17, n5 p2297-2304 Sep 81.

Insuring structural integrity of large superconducting magnet systems requires detailed knowledge of the low temperature behavior of many materials. This review describes recent research on alloys, nonmetallics and conductor composites related to their structural roles in these magnets. Special attention is paid to joining methods and their effect on the structure. It is encouraging to note that a reasonable amount of data is now available on a number of commercial alloys. It is somewhat disconcerting to see a rapid increase in design stress levels over the past several years, during which time very few large magnets have been put into operation.

PB82-140971 PC **A03**/MF **A01**
Electricity Council Research Centre, Capenhurst (England).
The Weathering of the PVC Insulation of Overhead Lines 2. Comparison of Natural and Artificial Weathering.
G. J. Le Poidevin. Oct 81, 27p ECRC/MI-485

The factors which influence the weathering in the UK of green poly(vinyl chloride) - PVC - used as insulation for overhead power lines have been investigated. Degradation processes such as surface cracking, bulk cracking and color change are explaind with reference to PVC composition. It is shown that artificial, accelerated weathering in a Xenotest-150 machine correlates well with long-term natural weathering, and can be successfully used for the rapid assessment of new compounds.

PB82-143975 Not available NTIS
National Bureau of Standards, Washington, DC.
Hydrodynamic Shock Wave Propagation After Electrical Breakdown.
Final rept.,
M. Zahn, E. O. Forster, E. F. Kelley, and R. E. Hebner. 1981, 6p
Pub. in Proceedings of International Conference on Conduction and Breakdown in Dielectric Liquids (7th), Berlin, Germany, F.R., July 27-31, 1981, p398-403.

Laser schlieren measurements in liquid dielectrics have been used to examine the radial expansion of both the acoustic shock wave and the conductive breakdown channel during the first few microseconds after electrical breakdown under high voltage impulse conditions.

PB82-144015 Not available NTIS
National Bureau of Standards, Washington, DC.
Dielectric Properties of PVDF-Low Field and High Field Phenomena and Time Effects.
Final rept.,
M. G. Broadhurst, G. T. Davis, and A. S. DeReggi. 1981, 11p
Pub. in Proceedings of Symposium on High-Energy-Density Capacitors and Dielectric Materials, Boston, Massachusetts, October 28, 1980, p67-77 1981.

The electrical properties of polyvinylidene fluoride (PVDF) are reviewed in view of its consideration as a dielectric in high energy density capacitors. PVDF is a semicrystalline polymer which is known to crystallize in at least four different crystal phases. Electrical properties of this polymer depend upon the amount and type of crystals present as well as their orientation which makes the properties of PVDF much more dependent on processing conditions than is the case for completely amorphous polymers. Dielectric properties of the polymer as a function of temperature, frequency, and orientation are reviewed. Remnant polarization, ferroelectric switching, piezoelectric and pyroelectric activity, and electrode effects in PVDF and copolymers of vinylidene fluoride with trifluorethylene or tetrafluorethylene are discussed.

PB82-803024 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Acoustic Surface Waves. April, 1976-November, 1981 (Citations from the NTIS Data Base).
Jan 82, 188p
Supersedes PB80-812589, and NTIS/PS-79/0749.

Surface wave devices, techniques, and applications are cited. Topics include signal processing, amplification, propegation, delay lines, transducers, and filters. (This updated bibliography contains 182 citations, 34 of which are new entries to the previous edition.)

SAND-80-0029C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Optically Coupled Microwave Switch.
R. A. Kiehl, and D. M. Drury. 1979, 14p CONF-800521-1
Contract EY-76-C-04-0789
Symposium digest, Washington, DC, USA, 28 May 1980.

A new mocrowave switch that uses lightwaves to couple microwave energy between its ports is shown to offer outstanding performance in terms of on/off ratio and reverse isolation while exhibiting a state independent input impedance. (ERA citation 05:024570)

9B. Computers

AD-A108 147/0 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

A Program Testing Assistant.
Memorandum rept.,
David Chapman. Nov 81, 25p Rept no. AI-M-651
Contract N00014-80-C-0505

This paper describes the design and implementation of a program testing assistant which aids a programmer in the definition, execution and modification of test cases and executes them automatically when appropriate. It modifies test cases to preserve their usefulness when the program they test undergoes certain types of design changes. The testing assistant acts as a fully integrated part of the programming environment and cooperates with existing programming tools, including a display editor, compiler, interpreter, and debugger. (Author)

AD-A108 183/5 PC **A04**/MF **A01**
Technology Service Corp., Santa Monica, CA.
Low Altitude Simulation/Prediction Techniques.
Final rept. 30 Sep 78-30 Dec 80,
Susan A. Knobel, Anthony J. Stenger, and Warren R. Stone. Jun 81, 60p TSC-PD-B623-1, RADC-TR-81-138
Contract F30602-78-C-0360
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Preparation of sensor predictions at the present time is a manual process requiring several hours of effort by highly trained personnel. This extremely slow response capability is unacceptable within the framework of most Air Force missions, particularly those of a tactical nature. The problem is accentuated in low-altitude missions where the effective sensor resolution places a greater burden on the existing sensor image prediction system and the supporting data bases. The purpose of the study was to analyze the use of image predictions in order to find a more compact set of prediction techniques that would result in a more efficient image prediction system. An experimental approach was used to determine the relationship between navigator performance and the type and amount of information in the prediction image. A number of subjects were given image predictions containing different image features and then asked to identify the predicted targets in corresponding dynamic flight sequences over scenes of cultural content. Three techniques were used to compress the amount of information contained in the image predictions. The techniques employed are edge representation, a reduction in resolution, and gray level quantization.

AD-A108 184/3 PC **A03**/MF **A01**
Oklahoma State Univ., Stillwater. Electronics Lab.
Automated PCM Encoder Temperature Test,
J. W. Spears. 15 Aug 81, 40p SCIENTIFIC-1, AFGL-TR-81-0242
Contracts F19628-81-C-0079, F19628-78-C-0033

This report describes an automated method for testing PCM encoder for performance through use of microcomputer control and analysis of the test results. The microcomputer sequentially applies to known test input voltage to various inputs of the encoder under test, analyzes the digitally encoded signals from the encoder for a large number of samples, and provides a printout of the test results. A description of computer software and interface hardware necessary for the test is included. (Author)

AD-A108 187/6 PC **A04**/MF **A01**
System Development Corp., Santa Monica, CA.
KVM/370 Technical Demonstration.
Final technical rept. 27 Oct 80-17 Apr 81,
Marvin Schaefer. Sep 81, 51p SDC-TM-7146/000/00, RADC-TR-81-254
Contract F30602-81-C-0018

This report documents the current status, future plans and results of an operational test and demonstration of a prototype trusted operating system called KVM/370 (for 'Kernelized Virtual Machine'/370). The report includes a description of an effort to install KVM/370 as a stand-alone operating system on an Amdahl V-7/A Computer in Patuxent River, MD. The implementation, verification, and ultimate certification for multilevel use of this operating system is a major goal in RADC's program to demonstrate the viability of trusted operating systems for DOD. (Author)

AD-A108 191/8 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

Computational Approaches to Image Understanding.
Memorandum rept.,
Michael Brady. Oct 81, 189p Rept no. AI-M-653
Contract N00014-80-C-0505

Recent theoretical developments in Image Understanding are surveyed. Among the issues discussed are: edge finding, region finding, texture, shape from shading, shape from texture, shape from contour, and the representations of surfaces and objects.

AD-A108 364/1 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
On Digital Processing via PDQ Factorization.
Memorandum rept.,
P. Bey, and C. C. Yang. 30 Nov 81, 14p Rept no. NRL-MR-4669

In this preliminary report, we present a computer program called MAT for implementing the PDQ factorization for digitized images of large pictorial data bases. Within a mini-computer, particular emphasis has been placed on the study of the efficiency of the algorithm in the storage and process of the images. (Author)

AD-A108 365/8 PC **A04**/MF **A01**
Naval Research Lab., Washington, DC.
A PRF Sorter Based on List Manipulation Techniques.
Interim rept.,
J. O. Coleman. 20 Nov 81, 62p Rept no. NRL-8514

This report describes a program that uses list processing techniques to sort pulses into sequences uniformly spaced in time, a process referred to as PRF sorting. The detailed discussion of the program's operation is based on a LISP implementation that functions on a demonstration level. A listing of a PASCAL version capable of operation on real data is also given. The unique feature of the algorithm used here is the ability to postpone the decision to assign a pulse to a particular existing pulse train. This is achieved by duplicating the existing pulse train and assigning the pulse to one of the two resulting pulse trains. Both pulse trains are then carried in the system, with equal status, until eventually a decision is made as to which is correct. The list structures used, native to LISP, prevent the duplication of pulse trains from resulting in unreasonable storage requirements. (Author)

AD-A108 405/2 PC **A02**/MF **A01**
Defense Mapping Agency Aerospace Center, St. Louis AFS, MO.
Profiling Sensitivity to Image Quality.
Final rept.,
Dennis E. Moellman. Oct 81, 21p

This paper reports results from a study conducted by the Defense Mapping Agency (DMA) to determine the sensitivity of terrain profiling accuracy to input image quality. The study was accomplished by building a set of stereo test models over a test site; exercising those test models with current instruments; reducing the resultant profile data and comparing the results to existing ground control for the test site. The test models were produced from a single model by repeated steps of photographic enlargement, reduction and resolution degradation. The resultant 25 test models represented all combinations of five specific image scales and resolutions. The instruments were operated in both manual and automatic correlation modes. As a consequence the results portray the interdependence of profile accuracy with both scale and resolution as well as the effects of both manual and automatic profiling. The results also provide insight into the behavior of automatic correlation when approaching and exceeding the instrument's theoretical minimum resolution threshold. (Author)

AD-A108 406/0 PC **A02**/MF **A01**
Defense Mapping Agency Aerospace Center, St. Louis AFS, MO.
Matrix Data Analysis: Color/B&W Coding is not Always Enough.
Interim rept. 1976-1981,
Marshall B. Faintich. 1981, 6p

The Defense Mapping Agency produces digital data bases that describe the physical appearance of the surface of the earth. These data bases include, but are not limited to, terrain elevation, culture including landscape characteristics, and vertical features. This data is collected from digitized source maps, from optically or digitally correlated stereopairs of photographic imagery, and from digital multi-spectral sensor data. A dramatic impact has been made in the ability to analyze these digital data bases by applying state-of-the-art digital image technology processing and display concepts. These include a variety of color and/or black and white displays of not only intensity/color coded matrix data, but also image processed data using specialized convolution filters, texture discrimination, and special color representation techniques. In addition, computer generated imagery from these data bases serve as a final analysis tool. (Author)

AD-A108 454/0 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Mission Analysis and Acquisition Div.
The World Wide Military Command and Control Information System--Problems in Information Resource Management.
19 Oct 81, 77p Rept no. GAO/MASAD-82-2
Report to the Congress of the United States.

GAO's evaluation of the World Wide Military Command and Control Information System modernization effort showed that continuing problems associated with providing automated support for command and control functions are not being properly addressed by DOD. DOD's efforts are not yet completed; however, the methods employed and progress to date are unlikely to enable the replacement of the World Wide Military Command and Control Information System to meet its intended goals. Further, these efforts are proceeding far too slowly to be considered responsive to the need to improve current system performance. DOD anticipates 10 more years will be necessary to modernize the system. GAO's evaluation of the modernization program shows that substantial changes are needed in the program's management structure before the system can be fully and effectively modified. (Author)

AD-A108 508/3 PC **A05**/MF **A01**
INCO, Inc., McLean, VA.
SQL Front-End Functional Description.
10 Nov 81, 84p Rept no. INCO/UP-1-81-83155-U
Contract N00014-81-C-0808

The IAIPS(Integrated Automated Intelligence Processing System) SQL Front-End System Functional Description is designed to provide the basis for high-level design specification for system implementation. The outline for this description follows the guidelines specified in the Automated Data Systems Documentation Standards issued in DOD Instruction 7935.1. The Navy's interest in database technology has its foundation in its need to manage and access large amounts of data originating from different sources. The IAIPS program, in support of Naval Intelligence, has the further requirement that this data be available to interactive users in near-real-time. This need is expected to be met, in part, by implementation of the relational database model, ORACLE, which provides a user-oriented interface to the large database currently in use.

AD-A108 527/3 PC **A13**/MF **A01**
SofTech, Inc., Waltham, MA..
The JOVIAL (J73) Workbook. Volume I. Integer and Floating Point Item-Declarations.
Interim rept. Dec 79-Oct 81.
Nov 81, 299p RADC-TR-81-333-VOL-1
Contract F30602-79-C-0040
Includes Volumes 2 through 6. See also Volume 10, AD-A108 528.

The JOVIAL (J73) Workbook is only one portion of a self-instructional JOVIAL (J73) training course. In addition to the programmed-learning primer/workbooks, are video taped lectures. The workbooks are formatted to consist of fifteen segments bound in three volumes covering each particular language capability. A video tape lecture was prepared for each workbook segment. This course is taught in two parts. Part I contains twelve segments in Volumes I and II of the workbook; Part II, Volume III contains three segments. There is a brief explanatory introduction at the beginning of the course. Each of the individual segments deals with a specific feature of the JOVIAL language. The video tapes acts as an overview to outline particular points that are followed up in the written workbooks. Each tape runs a maximum of 25 minutes and contains an average of 15 graphics each. (Author)

AD-A108 528/1 PC **A14**/MF **A01**
SofTech, Inc., Waltham, MA.

The JOVIAL (J73) Workbook. Volume 10. Directives.
Interim rept. Dec 79-Oct 81.
Nov 81, 306p RADC-TR-81-333-VOL-10
Contract F30602-79-C-0040
Includes Volumes 11 through 12. See also Volume 13, AD-A108 529.

For abstract see AD-A108 527.

AD-A108 529/9 PC **A06**/MF **A01**
SofTech, Inc., Waltham, MA.
The JOVIAL (J73) Workbook. Volume 13. Introduction to the CHOL Extensions.
Interim rept. Dec 79-Oct 81.
Nov 81, 121p RADC-TR-81-333-VOL-13
Contract F30602-79-C-0040
Includes Volumes 14 through 15. See also Volume 1, AD-A108 527.

For abstract see AD-A108 527.

AD-A108 555/4 PC **A09**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY. Research Dept.
Investigation of Large Capacity Optical Memories for Correlator Applications.
Final technical rept. 1 Apr 78-31 Mar 81,
Kenneth G. Leib, and Jay Mendelsohn. Oct 81, 193p RE-634, AFOSR-TR-81-0802
Contract F49620-78-C-0051

In this investigation of large capacity optical memories the basic memory element, the matched filter, was examined in a number of configurations, including coherent and noncoherent addition, split spectrum, and multiplexed carriers. Three different storage materials were examined: silver halide, dichromated gelatin, and photopolymers. Both thin and thick holographic memories were studied. The matched filters were evaluated using complex terrains such as woodlands, roadsides, and villages in which the principal targets (i.e. tanks, trucks and armored personnel carriers) were located. For each terrain and target, the signal-to-clutter ratio (s/c) was measured. These ranged from 5.5 to 11 dB for the target-terrain combinations studied. The complex matched filters that achieved these s/c's were recorded in dichromated gelatin. It was shown that more than 5 matched filters could be non-coherently added and 15 could be coherently added in the same memory position. In addition, it was demonstrated that carrier multiplexing could be used to achieve 30 matched filters per memory position. It is also shown that the theoretical limit for memory density of matched filters is 2670 MF/sq cm. This is equivalent to 1,000,000 bits of digital data. Various modifications of the basic optical matched filter were studied for the purpose of improving s/c ratio and increasing the storage density.

AD-A108 570/3 PC **A06**/MF **A01**
Performance Measurement Associates, Inc., Vienna, VA.
Effect of Automatic Processing on Specification of Problem Solutions for Computer Programs.
Technical rept. 1 Sep 79-1 Mar 81,
Edward M. Connelly, Robert F. Comeau, and Pamela Johnson. Mar 81, 125p Rept no. PMA-81-361
Contract N00014-79-C-0739

The ability of computer users to specify problem solutions with the help of example solutions was investigated as a function of the user's background and experience, various levels of processing and various levels of problem complexity. Two participant groups (programmers and bookkeepers/accountants) working with three levels of problem complexity and three levels of processor complexity were used. The experiment task employed in this study required specification of a logic for selection of a Navy Task force. The results showed that specification of problem solutions by example-solutions led to low rates of errors-of-commission. Further, the rate of errors-of-omission was significantly affected by the degree of generaliztion of the example inputs by the automatic processor. The results also suggested that the strategy used in developing the example solutions may be a significant factor in the generation of accurate problem solution specificaions.

AD-A108 582/8 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Mathematics.
Qualitative Texture Discrimination.
Technical rept.,
Benjamin Kedem. Oct 81, 31p TR-1117, AFOSR-TR-81-0792
Grants AFOSR-77-3271, AFOSR-80-C-0211

This paper investigates a set of features termed higher-order crossings for texture analysis. A general discrimination procedure is proposed based on statistics derived from sequential linear filters followed by a clipping operator, and the usefulness of this procedure in discrimination of texture fields is demonstrated. (Author)

AD-A108 584/4 PC **A03**/MF **A01**
Maryland Univ., College Park. Computer Vision Lab.
Synthesis of Textures Using Simultaneous Autoregressive Models.
Technical rept.,
R. Chellappa. Jul 81, 36p TR-1082, AFOSR-TR-81-0795
Grant AFOSR-77-3271

Experimental results of synthesis of some real textures using a class of spatial interaction models known as simultaneous autoregressive (SAR) models are given. The role of statistical inference methods in texture modeling is emphasized. (Author)

AD-A108 585/1 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Computer Science.
Generalizing Specifications for Uniformly Implemented Loops.
Technical rept.,
Douglas D. Dunlop, and Victor R. Basili. Oct 81, 41p TR-1116, AFOSR-TR-81-0791
Contract F49620-80-C-0001

The problem of generalizing functional specifications for WHILE loops is considered. This problem occurs frequently when trying to verify that an initialized loop satisfies some functional specification, i.e., produces outputs which are some function of the program inputs. The notion of a valid generalization of a loop specification is defined. A particularly simple valid generalization, a base generalization, is discussed. A property of many commonly occurring WHILE loops, that of being uniformly implemented, is defined. A technique is presented which exploits this property in order to systemically achieve a valid generalization of the loop specification. Two classes of uniformly implemented loops which are particularly susceptible to this form of analysis are defined and discussed. The use of the proposed technique is illustrated with a number of applications. Finally, an implication of the concept of uniform loop implementation for the validation of the obtained generalization is explained. (Author)

AD-A108 591/9 PC **A02**/MF **A01**
Massachusetts Univ., Amherst. Dept. of Computer and Information Science.
Development of a Program Testing System.
Final scientific rept. 1 Jun 77-30 May 81,
Lori A. Clarke. 30 May 81, 19p AFOSR-TR-81-0803
Grant AFOSR-77-3287

Programmers have historically used testing to convince themselves and others that their software works. Although testing has limitations, as do other reliability methods, it has one major advantage: it is the only method in which the actual behavior of the software can be observed. Thus, errors or oversights in the supporting environment, including the available validation tools, translators, operating system, and hardware, may be detected. Moreover, the actual performance can be evaluated for efficiency and usefulness.

AD-A108 602/4 PC **A02**/MF **A01**
Maryland Univ., College Park. Computer Vision Lab.
On Connectivity Properties of Grayscale Pictures.
Technical rept.,
Azriel Rosenfeld. Sep 81, 17p TR-1097, AFOSR-TR-81-0796
Grant AFOSR-77-3271

A grayscale digital picture is called 'connected' if it has only one connected component of constant gray level that is maximal, i.e., not adjacent to any component of higher gray level. This note establishes some equivalent conditions for connectedness, and also defines a grayscale generalization of the genus in terms of sums of local property values. (Author)

AD-A108 641/2 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Multi-Dimensional Signal-Processing Research Program.
Semiannual technical summary 1 Oct 80-31 Mar 81,
Dan E. Dudgeon. 31 Mar 81, 53p ESD-TR-81-94
Contract F19628-80-C-0002
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

In the area of image segmentation and classification, we have been developing a hierarchical segmentation scheme for processing images with several region classes. This approach appears to offer improvements over a direct multiclass segmentation. Adaptive contrast enhancement techniques have proved useful in several areas. We have used adaptive contrast enhancement as a preprocessor for image segmentation based on texture rather than gray level. We have also applied these techniques to aerial images degraded by light cloud cover and haze. The primary effects of this type of degradation are a reduction in contrast and an increase in the local average intensity of the image. We also discuss two aspects of the iterative implementation of multi-dimensional digital filters. This first concerns spatial truncation effects which occur during the iteration because the image frame buffer has a finite storage capability. The errors caused by this truncation are closely related to the solution of a boundary value problem with boundary conditions specified on the frame edges. These errors can be eliminated by including the boundary conditions in the spatially truncated iteration. Potential multiprocessor architectures are discussed for realizing multi-dimensional signal-processing operations such as those needed in the iterative implementation. An underlying problem is the efficient partitioning of multi-dimensional signal-processing problems among the several processors in a multiprocessor architecture.

AD-A108 645/3 PC **A11**/MF **A01**
Sterling Systems, Inc., Golden, CO.
Data Independent Accessing Methodology Distributed Access.
Final technical rept.,
Lowell I. Schneider, and Michael Levin. Jun 81, 242p RADC-TR-81-137
Contract F30602-79-F-0054

DIAM, The Data Independent Accessing Model, is a theory for describing the various ways in which information can be represented in a computer. This report uses a relational model of data to define the information resources of a collection of data archives, and the details of how it is stored to the extent necessary to extract it. Access begins by asking a question of the Relational Model (which cuts across sources in combination). The DIAM model then makes it possible to decompose the question into parts so small that no more than one source is needed to answer each part, translate each part to correspond to the representation used by the source, and recompose the translated parts into the largest possible pieces, each of which corresponds to a common source. These requests are then transmitted to the required sources and the returned information is decomposed and recomposed in precisely the opposite way that the question was, yielding the originally sought answer. The report concludes that it is now both feasible and justified to develop a prototype data base access compiler for experimental testing in existing networks. (Author)

AD-A108 656/0 PC **A03**/MF **A01**
Delaware Univ., Newark. Dept. of Computer and Information Sciences.
Practical Issues in Having a Usable Library of Software Specifications.
Interim technical rept.,
Ralph M. Weischedel. Mar 81, 40p AFOSR-TR-81-0799
Contract F49620-79-C-0131, Grant AFOSR-78-3539
Sponsored in part by Grant AFOSR-80-0190.

Though formal specifications of software modules offer much toward the design problems of large software systems, creating formal specifications is very difficult, requiring much upfront effort. This paper examines a common idea for dealing with the high cost of software, but in the context of specification. That idea is a pool or 'library' of specifications, so that it is easy to build on the work of others. Unlike other efforts that have concentrated on technical problems in having such a library, this paper identifies and studies several common sense requirements on such a library being effectively used. Such issues are closer related to human factors than to technical problems; yet these

are clearly as critical in use as technical issues. Our conclusions have arisen from two studies. In one, we wrote several module specifications in the form that might appear in a library. The module varied in complexity from a stack to the kernel of a text editor; the text editor specifications ranged in length from 9 to 28 pages including copious comments as in-line documentation. The second study compared portions of the English and formal specifications of KSOS (Ford Aerospace, 1978), the Kernelized Secure Operating System. The paper may be viewed as rather tutorial about writing correct, understandable formal specifications for others to use in their system design.

AD-A108 660/2 PC **A04**/MF **A01**
Maryland Univ., College Park. Dept. of Computer Science.
A Heuristic for Deriving Loop Functions.
Technical rept.,
Douglas D. Dunlop, and Victor R. Basili. Oct 81, 54p TR-1115, AFOSR-TR-81-0793
Contract F49620-80-C-0001

The problem of analyzing an initialized loop and verifying that the program computes some particular function of its inputs is addressed. A heuristic technique for solving these problems is proposed which appears to work well in many commonly occurring cases. The use of the technique is illustrated with a number of applications. A hierarchy of initialized loops is suggested which is based on the 'effort' required to apply this methodology in a deterministic (i.e. guaranteed to succeed) manner. It is explained that in any case, the success of the proposed heuristic relies on the loop exhibiting a 'reasonable' form of behavior. An informal categorization of such programs is made which is based on two opposing problem solving strategies. It is suggested that our heuristic is naturally suited for use on programs in one of these categories. (Author)

AD-A108 731/1 PC **A03**/MF **A01**
Royal Signals and Radar Establishment, Malvern (England).
Flex Firmware,
I. F. Currie, P. W. Edwards, and J. M. Foster. Sep 81, 37p RSRE-81009, DRIC-BR-81061

This report describes the instruction set and general firmware architecture of the Flex computer. This architecture was designed by programmers, for programmers and represents a radically new approach in computer design. (Author)

LA-8609-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
DOE Research in Utilization of High-Performance Computers.
B. L. Buzbee, W. J. Worlton, G. Michael, and G. Rodrigue. Dec 80, 15p
Contract W-7405-ENG-36

Department of Energy (DOE) and other Government research laboratories depend on high-performance computer systems to accomplish their programatic goals. As the most powerful computer systems become available, they are acquired by these laboratories so that advances can be made in their disciplines. These advances are often the result of added sophistication to numerical models whose execution is made possible by high-performance computer systems. However, high-performance computer systems have become increasingly complex; consequently, it has become increasingly difficult to realize their potential performance. The result is a need for research on issues related to the utilization of these systems. This report gives a brief description of high-performance computers, and then addresses the use of and future needs for high-performance computers within DOE, the growing complexity of applications within DOE, and areas of high-performance computer systems warranting research. 1 figure. (ERA citation 06:010058)

N82-13766/2 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Survey of Standards Applicable to a Database Management System.
J. L. Urena. 15 Oct 81, 51p NASA-CR-165009, JPL-PUB-81-88
Contract NAS7-100

Industry, government, and NASA standards, and the status of standardization activities of standards setting organizations applicable to the design, implementation and operation of a data base management system for space related applications are identified. The applicability of the standards to a general purpose, multimission data base management system is addressed.

N82-13767/0 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Software Design and Documentation Language: User's Guide for SDDL Release 4.
T. M. Zepko. 15 Sep 81, 13p NASA-CR-165025, JPL-PUB-77-24-REV-1-ADD-1
Contract NAS7-100
Revised.

The changes introduced in the PASCAL implementation of the software design and documentation language are described. These changes include a number of new capabilities, plus some changes to make the language more consistent and easier to use. Incompatibilities with earlier versions are limited to certain of the directive statements.

N82-13768/8 PC **A06**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Computer Vision.
D. Gennery, R. Cunningham, E. Saund, J. High, and C. Ruoff. 1 Nov 81, 104p NASA-CR-165012, JPL-PUB-81-92
Contract NAS7-100

The field of computer vision is surveyed and assessed, key research issues are identified, and possibilities for a future vision system are discussed. The problems of descriptions of two and three dimensional worlds are discussed. The representation of such features as texture, edges, curves, and corners are detailed. Recognition methods are described in which cross correlation coefficients are maximized or numerical values for a set of features are measured. Object tracking is discussed in terms of the robust matching algorithms that must be devised. Stereo vision, camera control and calibration, and the hardware and systems architecture are discussed.

N82-13777/9 PC **A12**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Hamburg (Germany, F.R.).
Increase in the Profitability of Design and Process Planning by Integrated and Graphic Data Processing, Phase 1.
Final Report.
R. Feddersen, U. Grupe, and J. Nagel. Jan 81, 275p BMFT-FB-W-81-005, ISSN-0170-1339
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The basic concepts of computer aided design systems are reviewed and generalized for application throughout the entire production process. Examples from aerospace technology are illustrated. The principles and operation modes of the selected computer-graphics interactive data-processing and programming system are exposed and its utilization assessed in the fields of lofting, structure analysis, tool design, numerical control programming, process planning and order processing. It is found that a favorable basis is thus created for the development of machine independent programs and interactive methods.

N82-13778/7 PC **A03**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Mesh Generating and Plotting Facilities of the LAMCAL Program.
L. G. Lamain. 1980, 47p EUR-7099-EN
Submitted for Publication.

The complete LAMCAL program consists of three parts: mesh generation; the elastoplastic finite element part; and the plotting part. The three parts are connected by means of an overlay structure using peripheral units as interfaces, which allows them to be used together, separately, or in combination with other computer programs. The mesh generation and the plotting part of the LAMCAL program are described and the input formats are given. Output formats available for mesh generation are Bersafe, Eurdyne and Semiloof. With varying degrees of effort, all kinds of two-dimensional meshes and some three-dimensional meshes (plate and solid element) may be generated. Special attention is given to meshes for crack problems. The input file for the plotting part can contain any number, and in any order, data for mesh, isofunction, and deformation plots. An existing mesh can also be plotted. Messages about available and required core are given in the program.

N82-13780/3 PC **A07**/MF **A01**
ERIA/ECA Automation, St. Cloud (France).
Study on the Implementation of a Program for Quality Control of Computer Programs, Phase 1 l'Etude de la Mise en Place d'UN Programme d'Assurance de Qualite des Logiciels - Phase 1.
Final Report.
Nov 80, 127p ESA-CR(P)-1444
Contract ESTEC-4182/79/NL-PP(SC)
Text in French.

A coherent system of quality control for computer programs is defined. Problems arising with the different approaches available for determining the quality of a program are reviewed. Quality requirements specific to ESA are identified. A computer program quality package is presented. Subroutines for static and dynamic analyses are outlined. The ESA programming capabilities are assessed and the characteristics of a specification routine are given. The possibility of ESA's implementing this solution (time and means necessary) is estimated.

N82-13891/8 PC **A15**/MF **A01**
Ecole Nationale Superieure des Telecommunications, Paris (France).
Far Infrared Source Classification System Systeme de Classification des Sources Infrarouge Lointain.
Ph.D. Thesis.
M. Y. Mahmoud. Apr 80, 333p ENST-E-80005

A hardware solution to the problem of classification of isolated IR sources is proposed. The impact of IR technology on the design of a special purpose nonimage forming IR system is discussed. Simulation of the system elements and their effect on IR image acquisition, feature extraction, and classification is analyzed. The algorithms of feature extraction by on-line routines or special purpose hardware are explained. A high density IR mosaic detector is presented which allows for efficient extraction. Although the proposed mosaic geometry is intended for nonimaging applications, its possible extension to IR imaging is pointed out.

ORNL/TM-7353 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
User and System Considerations for the TCSTEK Software Library: A Graphics Library for Displaying Images on Tektronix 4000 Series Storage Tube Terminals.
W. H. Gray. Nov 80, 47p
Contract W-7405-ENG-26

This report documents the idiosyncrasies of the Tektronix PLOT 10 Terminal Control System (TCS) level 3.3 software as it currently exists on the Oak Ridge National Laboratory Fusion Energy Division DECsystem-10 computer. It pertains to the graphics software library called TCSTEK, which may be used to convert TCS subroutine calls into display images on the screens of Tektronix 4000 series storage tube terminals. Fully described here are several user-oriented enhancements and system efficiency modifications to the vendor-supplied TCS software library. It is intended that this report serve as a reference for future TCS updates so that continuity between releases of TCS PLOT 10 software may be maintained. 1 figure. (ERA citation 06:005630)

ORNL/TM-7363 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
CAMAC Modular Programmable Function Generator.
G. W. Turner, S. Suehiro, and R. W. Hendricks. Dec 80, 42p
Contract W-7405-ENG-26

A CAMAC modular programmable function generator has been developed. The device contains a 1024 word by 12-bit memory, a 12-bit digital-to-analog converter with a 600 ns settling time, an 18-bit programmable frequency register, and two programmable trigger output registers. The trigger registers can produce programmed output logic transitions at various (binary) points in the output function curve, and are used to synchronize various other data acquisition devices with the function curve. (ERA citation 06:006437)

PATENT-4 298 858 Not available NTIS
Department of the Air Force, Washington, DC.
Method and Apparatus for Augmenting Binary Patterns.
Patent,
John G. Romanski. Filed 27 Mar 80, patented 3 Nov 81, 10p AD-D009 052/2, PAT-APPL-6-134 718
Supersedes PAT-APPL-6-134 718, AD-D007 121.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The conversion of simpel 1 and 0 PIXELS of a binary pattern into PIXELS with numerical values dependent upon relative location in the original pattern is realized by a technique that identifies various types of PIXELS including the edge PIXELS in contiguous groups of 1 PIXELS. A multilevel pattern using the various types of PIXELS is developed and a numerical value assigned to each PIXEL. The numerical value for each PIXEL is a function of its own type and the types of its near neighbor PIXELS. Pattern measurements for the augmented pattern are less sensitive to erroneous cell deletions than for simple binary patterns. The technique is implemented by a simple mechanization for generating the augmented pattern. The mechanization is characterized by operations that are easily implemented in a real time environment using standard digital logic devices. (Author)

PB82-135005 CP **T14**
Rome Air Development Center, Griffiss AFB, NY.
JOVIAL (J73/I) Compiler, IBM Version.
Software.
25 Jun 79, mag tape FSWEC-80/0088
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB82-135013.
U.S. sales only.

This compiler processes MIL-STD-1589, JOVIAL (J73/I) programs, producing object modules for execution on the IBM 360/370 computer or the Digital Avionics Integration System (DAIS) Hot Bench computer, the AN/AYK-15. Validation test results indicate that the compiler does not conform to MIL-STD-1589. The compiler accepts non-parenthesized formulas and floating point members as constants and fails to produce type conversion messages to warn programmers of implicit conversions in constants. This problem will be corrected in the next release of the compiler. All users will be sent the new corrected version, at no charge, as soon as it becomes available...Software Description: The program is written in the JOVIAL (J73/I) programming language for implementation on an IBM 360/370 or equivalent computer using the OS 360/370 operating system. Computer memory requirement is 350K.

PB82-135013 PC **A06**/MF **A01**
SofTech, Inc., Waltham, MA.
J73/I Interim Compiler User's Manual.
Jun 79, 106p 1049D-A015, FSWEC-80/0088-1
Contract F30603-78-C-0188
For system on magnetic tape, see PB82-135005.
U.S. sales only.

This manual presents information in three parts useful to programmers who wish to compile, link, and execute J73/I programs on the IBM/370, or who wish to compile J73/I programs for the AN/AYK-15 (HBC) on the IBM/370. The first two parts comprise information related to the compilation process and the loading and execution of J73/I programs. The third part presents and explains the use of sample JCL procedures for compiling, linking, and executing. Four appendices are included. The first lists the ASCII character set. The second describes the format of the delivery tape and the procedures needed to install the compiler. The third lists the text of the diagnostic messages generated by the compiler. The fouth appendix describes the procedure for transferring object modules compiled for the AN/AYK-15 to the DEC-10 for linkage and simulation on the DEC-10.

PB82-135021 CP **T14**
Air Force Avionics Lab., Wright-Patterson AFB, OH.
JOVIAL J73 (MIL-STD 1589A) Compiler.
Software.
1 Jul 80, mag tape FSWEC-81/0025
Source tape is in ASCII character set. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB82-135039, PB82-135047, PB82-135054, and PB82-135062. U.S. sales only.

This tape contains the JOVIAL J73 (MIL-STD 1589A) compiler with DEC-10 and MIL-STD 1750 targets. Also included are the DEC-10 and 1750 library of run-time routines, and a Input/Output COMPOOL which is used with the special I/O facility (see Users Instructions). The host computer is the DEC-10, TOPS-10 Operating System with a KA KI or KL processor...Software Description: The program is written in the JOVIAL J73/I and DEC-10 Macro programming languages for implementation on a DEC-10 computer using the TOPS-10 operating system. This tape was created with the BACKUP utility program and cannot be copied on an IBM system. Computer memory requirement is approximately 75K words.

PB82-135039 PC **A02**/MF **A01**
Air Force Avionics Lab., Wright-Patterson AFB, OH.
JOVIAL J73 (MIL-STD 1589A), Users Instructions.
1980, 24p FSWEC-81/0025A
For system on magnetic tape, see PB82-135021.
U.S. sales only.

This document contains users instructions for the JOVIAL J73 compiler with DEC-10 and MIL-STD 1750 targets.

PB82-135047 PC **A03**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
J73 Compiler Validation Report, Test Analysis Report, DEC-10 Compiler (Initial Validation).
13 Jun 80, 49p FSWEC-81/0025B
For system on magnetic tape, see PB82-135021.
U.S. sales only.

The contents of this report pertains to the validation of the AFAL JOVIAL J73 compiler targeted for and hosted on the DEC-10 at AFAL only. Test procedures used for the validation are described. Evaluation of the JOVIAL J73 compiler is based solely upon the JCVS test set and, therefore, all performance percentages presented in this report should be considered only as a measure of compiler correctness and not an absolutely comprehensive performance measurement.

PB82-135054 PC **A04**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
J73 Compiler Validation Report, Test Analysis Report, MIL-STD-1750 Cross Compiler (Initial Validation).
6 Jun 80, 63p FSWEC-81/0025C
For system on magnetic tape, see PB82-135021.
U.S. sales only.

The MIL-STD-1750 J73 compiler tested was hosted on the DEC-10 computer at the AFAL and produced code for a MIL-STD-1750 compatible machine. The version of the validator used was V210480. The validation testing identified compiler deficiencies which indicate nonconformance, such as expansion of Define Calls not functioning in some cases, several problems with CASE statement, and improper placement of directives not detected.

PB82-135062 PC **A17**/MF **A01**
SofTech, Inc., Waltham, MA.
Computer Programming Manual for the JOVIAL (J73) Language.
Jan 80, 387p 1049D-A009-8001, FSWEC-81/0025D
Contract F30602-78-C-0188
For system on magnetic tape, see PB82-135021.
U.S. sales only.

This manual is a combined tutorial and reference manual for the JOVIAL (J73) language. The main body of the manual describes the entire language, giving motivation and examples for each feature. A programmer can read the manual to learn the language and then use Appendix A for reference purpose. The manual is intended for a reader who has had previous experience with assembly language or some higher order language. The presentation is informal and nonmathematical.

PB82-135070 CP **T14**
Air Force Avionics Lab., Wright-Patterson AFB, OH.
JOVIAL J73/I Compiler, DEC-10 Version.
Software.
1 Sep 79, mag tape FSWEC-80/0087
Source tape is in ASCII character set. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB82-135088, PB82-135096, PB82-135104, PB82-135112, PB82-135120, and PB82-135138. U.S. sales only.

The software being referred to in this narrative is the J73/I compiler (JOVIAL J73/I). The host computer is the DEC-10, TOPS-10 Operating System with a KA, KI, or KL processor. The target machines on which programs generated by the J73/I compiler will run include the DEC-10, AN/AYK-15, DELCO MAGIC M362F, and the SAMSO FAULT TOLERANT SPACE BORN computer. The compiler is written in the J73/I and the DEC-10 Assembly Languages. It generates listing files with cross-reference, and relocatable object files in DEC-10 format. The known differences from MIL-STD 1589 are minor...Software Description: The program is written in the JOVIAL J/73I and DEC-10 Assembly programming languages for implementation on a DEC-10 computer using the TOPS-10 operating system. Computer memory requirement is 128K words. The tape can only be copied on a DEC-10 computer using the MTCOPY utility.

PB82-135088 PC **A12**/MF **A01**
Computer Sciences Corp., El Segundo, CA.
JOVIAL J73/I Computer Programming Manual.
Oct 77, 264p FSWEC-80/0087A
For system on magnetic tape, see PB82-135070.
U.S. sales only.

This manual specifies the level I subset of the JOVIAL 73 language, abbreviated as J73/I or J73 and serves as a guide to use of the language and its compilers. The description of J73 is intended primarily as a reference manual and not as a rigorous formal language specification. The manual is not structured as a tutorial; however, considerable use is made of practical examples to assist in describing the language. The manual comprises eight chapters which provide a machine independent description of J73 and various appendices containing a summary cross-referenced syntax, system dependent parameters, compiler limits, and a guide to compiler usage.

PB82-135096 PC **A08**/MF **A01**
Computer Sciences Corp., El Segundo, CA.
JOVIAL J73/I DEC-10 Programming Languages Interface Manual.
c1975, 164p MA204200-2, FSWEC-80/0087B
For system on magnetic tape, see PB82-135070.
U.S. sales only.

This manual has been prepared as a single-source document to assist the DEC-10 user in preparing hybrid programs created from several of the language processors available on the DEC-10. The languages considered in the manual are JOVIAL J73/I, Fortran-10, COBOL, MACRO-10, and JOVIAL J70.

PB82-135104 PC **A02**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
J73/I Version Description Document.
1 Sep 79, 24p 6404.NF-115, FSWEC-80/0087C
Contract F33615-78-C-1637
For system on magnetic tape, see PB82-135070.
U.S. sales only.

The JOVIAL J73/I compiler generates listing files with cross-reference and relocatable object files in DEC-10 format. The Version Description Document describes the J73/I compiler, Version 090179. This version contains enhancements and improvements to correct NRTSS and DAIS Problem Reports (PR).

PB82-135112 PC **A03**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
JOVIAL J73 Compiler, Generation and Test Plan/Procedures Document (Preliminary).
D. H. Burdeshaw. 28 Apr 78, 41p PA-204200, FSWEC-80/0087D
For system on magnetic tape, see PB82-135070.
U.S. sales only.

This document is intended to serve as a reference for personnel responsible for the maintenance of the JOVIAL J73 Compiler on the AFAL DEC-10. The data presented in this document are based on existing procedures at the source installation and would require modification for other DEC-10 installations. Both the files and procedures necessary to generate a version

of the J73 Compiler are listed and described. The Test Plan/Procedures for performing regression testing are described and the individual tests are detailed. The J73 Compiler as generated and tested is compatible with all DEC-10 series from KA10 through KL10. The sole purpose of the testing described in this document is to determine whether or not a new version of the compiler passes and/or fails the same tests as the previous version of the compiler.

PB82-135120 PC **A02**/MF **A01**
Computer Sciences Corp., El Segundo, CA.
JOVIAL J73/I Retargetability Guideline Manual.
c1976, 20p MA204200-6, FSWEC-80/0087E
Contract F33615-74-C-1161
For system on magnetic tape, see PB82-135070.
U.S. sales only.

This manual describes the methods for augmenting the JOVIAL J73/I compiler to produce object code for a new, unspecified avionics computer. Areas of the compiler that must be modified to produce object code for another computer are identified, tools required for retargeting the compiler are described, and the estimated cost and schedule are provided.

PB82-135138 PC **A03**/MF **A01**
Computer Sciences Corp., El Segundo, CA.
JOVIAL J73/I Rehostability Procedure Manual.
c1976, 32p MA204200-7, FSWEC-80/0087F
Contract F33615-74-C-1161
For system on magnetic tape, see PB82-135070.
U.S. sales only.

This manual describes the methods for moving the JOVIAL J73/I compilation capability from the DEC-10 computer system to another host computer. Areas of the compiler requiring modification are identified, step-by-step procedures for rehosting are described, and estimates of the cost and time for rehosting are provided.

PB82-138413 CP **T03**
Navy Regional Data Automation Center, Washington, DC.
FORTRAN Instrumentation Package (FIP) (UNIVAC 1100 Version).
Software.
1 Dec 79, mag tape FSWEC-81/0009
Source tape is in ASCII character set. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB82-138421.

FIP inserts performance measuring statements into a user's Fortran source program. This instrumented program is then compiled and mapped with necessary FIP subroutines, then executed with user input data. After execution, FIP produces a report on execution counts, time, and percent of time by statement or groups of statements, and logic path analysis. Programmers can usually revise critical code quickly to gain substantial optimization or provide additional test data so program is sufficiently tested...Software Description: The program is written in the Fortran and Assembler programming languages for implementation on a UNIVAC 1100 series computer using the EXEC 8 operating system. The computer memory requirement is 10K words.

PB82-138421 PC **A03**/MF **A01**
Navy Regional Data Automation Center, Washington, DC.
FORTRAN Instrumentation Package (FIP) for UNIVAC 1100 Series Computers, Users Manual.
9 Dec 80, 34p NARDAC-91S1009-UM-04, FSWEC-81/0009-1
For system on magnetic tape, see PB82-138413.

The Fortran Instrumentation Package (FIP) is a UNIVAC 1100 series software package intended to assist the Fortran programmer in optimizing, testing and debugging source programs. FIP is essentially a software monitoring tool used to facilitate program optimization. Two additional data processing activities, testing and debugging, can greatly benefit through the use of FIP. Information in this Users Manual corresponds to level 3.0 of the FIP program, which signs on as 'FIP REL 3.0'. The objective of the Manual is to provide the user's non-ADP personnel with the information necessary to effectively use the system.

PB82-138439 CP **T05**
Navy Regional Data Automation Center, Washington, DC.
COBOL Instrumentation Package (CIP) (UNIVAC 1100 Version).
Software.
25 Jun 80, mag tape FSWEC-81/0008
Source tape is in ASCII character set. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation, PB82-138447.

CIP inserts performance measuring statements into a user's COBOL source program. This instrumented program is then compiled and mapped (link-edited) with necessary CIP subroutines, then executed with one or more different sets of user input data. After any execution, CIP can produce a report on execution counts, time, and percent of time by paragraph, and logic path analysis. Programmers can usually revise critical paragraphs quickly to gain substantial optimization, or reject program as insufficiently tested, etc...Software Description: The program is written in the COBOL and Assembler programming languages for implementation on a UNIVAC 1100 series computer using the EXEC 8 operating system. The computer memory requirement is 10K words.

PB82-138447 PC **A03**/MF **A01**
Navy Regional Data Automation Center, Washington, DC.
ASCII COBOL Instrumentation Package (CIP) for the UNIVAC 1100 Series Computers, Users Manual.
Apr 81, 44p NARDAC-91S1009-UM-05, FSWEC-81/0008-1
For system on magnetic tape, see PB82-138439.

The COBOL Instrumentation Package (CIP) is a UNIVAC 1100 series software package intended to assist the COBOL programmer in optimizing, testing, and debugging his source programs. CIP is essentially a software monitoring tool used to facilitate program optimization. Two additional data processing activities, testing and debugging, can greatly benefit through the use of CIP. Information in this Users Manual corresponds to level 3.7 of the CIP program which signs on as CIP REL 3.7. Effective with this level CIP now supports both ASCII and FIELDATA COBOL programs, and also requires no punch-card estimate on the RUN card. The objective of the Manual is to provide the user's ADP personnel with the information necessary to effectively use the system.

PB82-145160 PC **A04**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Karlsruhe (Germany, F.R.). Inst. fuer Informations- und Datenverarbeitung.
Current State of Research and Development Activities in the Field of Pattern Recognition in the Federal Republic of Germany,
M. Bohner, H. Kazmierczak, H. Tropf, and G. Winkler. Jun 80, 68p BMFT-FB-DV-80-003
Trans. of mono. Derzeitiger Stand der Forschungs- und Emtwicklungsaktivitaeten auf dem Gebiet der Mustererkennung in der Bundesrepublik Deutschland, n.p., n.d. See also German report N81-21820/8. Prepared in cooperation with Forschunggsinstitut fuer Informationsverarbeitung und Mustererkennung, Karlsruhe (Germany, F.R.).

Research is described in remote sensing, speech and language analysis, character recognition, acoustics, biomedical analysis, and industrial and military orientation applications. The implementation of the various procedures developed is exposed, emphasis being given to the equipmet used and the acquisition and processing of the data obtained.

PB82-146002 PC **A02**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Parallel Processing for Control Algorithm Implementation,
D. Aldabass. Jan 80, 9p CONTROL SYSTEMS CENTRE-472.

Five levels of concurrency are identified when implementing dynamical system algorithms on parallel and multiprocessor computers. These are the Sub-Integration-Cycle level, the Integration-Cycle level, the Control-and-State-Space division levels, and the Infimals-TPBVP level. Examples and efficiency formula are given to illustrate these levels.

PB82-146044 PC **A02**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Multiprocessing Performance Models for Parallel Computation: Part II. Single Processor Transfers,
D. Aldabass. May 80, 22p CONTROL SYSTEMS CENTRE-477
See also Part 3, PB82-146051.

One of the simplest ways of coordinating a number of processors in executing a task in parallel is to leave all the data transfers to a single master processor. In this report models are formulated for this system to estimate the reduction in execution time, and efficiency of operation. Detailed expressions are derived for the performance of such system. Six examples are given to illustrate the use of the theory.

PB82-146051 PC **A02**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Multiprocessing Performance Models for Parallel Computation: Part III. Common Memory Systems: Preliminaries and a Basic Performance Model,
D. Aldabass. Jun 80, 20p CONTROL SYSTEMS CENTRE-480
See also Part 2, PB82-146044 and Part 4, PB82-146069.

A number of parameters are put forward to characterize the operation of common-memory multiprocessing systems. These are divided into hardware, problem oriented, and user related parameters. A simple performance model is formulated, and a number of relationships are derived to interrelate the speedup factor, the efficiency, and the number of processors used. An example is examined in detail to illustrate four major aspects of the system behavior.

PB82-146069 PC **A03**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Multiprocessing Performance Models for Parallel Computation: Part IV. Common Memory Systems: Two Detailed Models,
D. Al-Dabass. Jul 80, 41p CONTROL SYSTEMS CENTRE-481
See also Part 3, PB82-146051.

Updating the variables stored in common memory is perhaps one of the most important aspects of operating such a multiprocessor system. Two methods are put forward here: the Double-Store Alternating-Index method, and the Separate Computation-Overheads method. Detailed performance models are formulated for these two methods, and several examples are given to illustrate some aspects of the theory.

PB82-148073 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
Mesh-Generating and Plotting Facilities of the LAMCAL Program (User's Manual),
L. G. Lamain. c1981, 50p EUR-7099-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The complete LAMCAL program consists of three parts: (1) mesh generation, (2) elasto-plastic finite element part, (3) plotting part. These three parts are connected by means of an overlay structure using peripheral units as interfaces, which allow them to be used together, separate or in combination with other computer programs. Keywords are used for clarity and to simplify the input data, and unified input formats reduce format errors in the input data to a minimum. A print-out is given for batch jobs and TSO jobs. Examples show mesh for plate elements and mesh for crack problems. (Copyright (c) by ECSC-EEC-EAEC, 1981.)

PB82-803446 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Pattern Recognition and Image Processing. August, 1979-July, 1980 (Citations from the NTIS Data Base).
Jan 82, 249p
See also 1964-Jun 75, NTIS/PS-76/0608, Jul 75-77, NTIS/PS-78/0845, and Aug 77-Jul 79, PB80-814221.

The bibliography cites research reports on pattern recognition and image processing. Research on processing color pictures, image enhancement and restoration, feature extraction, edge detection, and scene analysis are included. Optical character recognition is excluded, but is available as a separate bibliography.

(This updated bibliography contains 244 citations, none of which are new entries to the previous edition.)

PB82-803453 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Pattern Recognition and Image Processing. August, 1980-November, 1981 (Citations from the NTIS Data Base).
Jan 82, 294p
Supersedes PB80-814239, and NTIS/PS-79/0872. See also 1964-Jun 1975, NTIS/PS-76/0608, Jul 1975-77, NTIS/PS-78/0845, and Aug 1977-Jul 79, PB80-814221.

The bibliography cites research reports on pattern recognition and image processing. Research on processing color pictures, image enhancement and restoration, feature extraction, edge detection, and scene analysis are included. Optical character recognition is excluded, but is available as a separate bibliography. (This updated bibliography contains 289 citations, all of which are new entries to the previous edition.)

PB82-861360 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Optical Memory Data Storage. June, 1970-January, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jan 82.
Jan 82, 81p
Supersedes PB80-856107.

This bibliography contains citations concerning technology, design, and capacity of optical memory systems. Optical data recording techniques including disc memories, holographic memories, pattern recognition systems, and image memories, are considered. The use of optical filters, electrooptic materials, and ferroelectric crystals is also discussed. (This updated bibliography contains 83 citations, 28 of which are new entries to the previous edition.)

SLAC-TN-80-2 PC **A04**/MF **A01**
Stanford Linear Accelerator Center, CA.
SLAC/RAI LSI-11/2 Construction/Configuration Guide.
J. Kieffer. Jul 80, 65p
Contract AC03-76SF00515

This document serves as a user's manual as well as a guide to building and testing an LSI-11/2 as packaged by SLAC Research Area Instrumentation. The manual is divided into the following chapters. Introduction to user-configured systems using the SLAC 135-637 chassis; Buying modules (PC boards) and subcomponents of the system; Details of the SLAC MK-II chassis (SLAC 135-637); Preliminary testing instructions; Installation of computer modules into finished chassis; System testing; Software notes. 23 figures. (ERA citation 05:034450)

UCRL-52890 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
UNIX Performance Enhancements Through the Use of a Large-Block Buffering Scheme.
J. A. Schriebman. 10 Jan 80, 17p
Contract W-7405-ENG-48

Aggregate throughput of disk drives is a frequent bottleneck in the UNIX operating system. A method for achieving a 10% to 30% increase in throughput by the use of multi-sector disk reads and in-core disk sector buffering is described. 5 tables. (ERA citation 05:023395)

UCRL-52964 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Crosslinking of Computer Terminals for Nationwide Tutorial Instruction.
J. A. Schriebman, and J. E. Swanson. Nov 80, 10p
Contract W-7405-ENG-48

A procedure is described for the linking of two or more terminals for demonstrating the use of new software to researchers at distant locations. This linking procedure, which can be used for either real-time tutorials or a classroom-type of instruction, has proven invaluable in actual use, and has been implemented on a UNIX V-6 operating system at the Lawrence Livermore National Laboratory. The procedure was developed under the auspices of the Department of Energy's Office of Advanced Conservation Technologies (formerly the Division of Energy Storage Systems). 2 figures. (ERA citation 06:006807)

9C. Electrical and Electronic Engineering

AD-A108 347/6 PC **A07**/MF **A01**
California Univ., Berkeley. Electronics Research Lab.
Joint Services Electronics Program.
Annual progress rept. 1 Sep 80-31 Aug 81,
D. J. Angelakos. 30 Sep 81, 144p UCB/ERL-81/1, AFOSR-TR-81-0850
Contract F49620-79-C-0178

An annual report of the JSEP (Joint Services Electronics Program) in Electromagnetics, Solid State Electronics, Materials and Devices, Quantum Electronics and Information Sciences is presented. Partial contents include: Electromagnetic Scattering by Multiple Targets and Targets in Multiple Media; Hot-Electron Injection and Trapping at Si/Insulator Interfaces; Molecular Beam Epitaxy and Its Applications to Studies of Materials Aspects of Microstructure Engineering; Study of Effects Limiting Realization of Far-Submicron Superconductive Electronic Structures; Research on Electronic Systems Composed of Polymer Films and Planar Si Devices for Transducer Applications; Millimeter and Infrared Heterodyne Mixing and Detection, and Computer Optimization of Electronic Circuits.

AD-A108 352/6 PC **A02**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
Structure of a Multibeam Adaptive Space-Time Processor.
Technical memo.,
L. H. Sibul, and Guy R. L. Sohie. 30 Jul 81, 19p Rept no. ARL/PSU/TM-81-156
Contract N00024-79-C-6043

It is shown that an adaptive multi-input, multi-output space-time processor (beamformer and filter) consists of a multi-input, multi-output adaptive processor and a nonadaptive beamsteering operator. The adaptive processor is determined by the spatial and temporal properties of the noise field; whereas, the beamsteering operator is determined a priori by the desired beamsteering directions. In this structure, the multichannel adaptive processor is common to all the desired beamsteering directions. (Author)

AD-A108 376/5 PC **A02**/MF **A01**
Aeronautical Systems Div., Wright-Patterson AFB, OH. Directorate of Avionics Engineering.
MIL-STD-462-Application Note: Identification of Broadband and Narrowband Emissions.
1 May 80, 12p Rept no. ASD/ENA-TR-80-3

Noise classification techniques used by many test agencies are not in accordance with MIL-STD-462 requirements. The intent of MIL-STD-462 is that one bandwidth be used in each receiver frequency band with the noise being classified as it appears with regard to that bandwidth. One of the main difficulties is selecting appropriate receiver bandwidths. An approach to bandwidth selection is presented which is consistent with noise classification in accordance with MIL-STD-462 and which eliminates some of the difficulty in determining the appropriate classification of noise.

AD-A108 388/0 PC **A04**/MF **A01**
Federal Aviation Administration, Washington, DC.
Electronic Equipment, General Requirements.
Specification.
22 Jun 81, 63p Rept no. FAA-G-2100C
Supersedes FAA-G-2100/1b, FAA-G-2100/2a, FAA-G-2100/3a, FAA-G-2100/4b and FAA-G-2100/5a.

This specification covers the general requirements for the design and construction of ground electronic equipment. This specification establishes the ambient conditions within which equipment must operate satisfactorily and reliably; the general material, the process for selection and application of parts, and the tests for ground electronic equipment. Requirements applicable to individual equipments shall be as specified in the individual equipment specifications. (Author)

AD-A108 402/9 PC **A02**/MF **A01**
Virginia Univ., Charlottesville.
Superconducting Electronics.
Final technical rept. 1 Jul 77-31 Dec 80,
Bascom S. Deaver, Jr., and Robert J. Mattauch.
1981, 20p
Contract N00014-77-C-0440

The objectives of the research have been (1) to design, fabricate, and test Josephson mixers for use at frequencies greater than 100 GHz, (2) to fabricate and characterize various types of microbridges, particularly ones on semiconductor substrates which may exhibit measurable interaction with the substrate and (3) to measure the microwave properties of some NbN SQUIDs. Progress made on all of these topics is summarized and references to publications reporting the results in more detail are presented.

AD-A108 494/6 PC **A05**/MF **A01**
ARINC Research Corp., Annapolis, MD.
Impact of Technology on Avionics Cost Trends,
Steven Toth, William Lovelace, and Kelly Markin.
Nov 81, 84p 1378-40-2-2553, FAA-EM-82-6
Contract DTFA01-80-C-10030

This study provides an overview of nonmilitary generally aviation and commercial avionics price and cost structures as influenced by technology. It quantifies, computes, and evaluates the unique characteristics and behavior patterns of the industry, especially those that affect the frequency of innovation, the rate of technology diffusion from manufacturer to manufacturer or from product to product, and the anticipated major cost drivers of the future. The report reviews the impact of technology on the cost of avionics during the past 20 years and projects this impact for the next 20 years. This report concentrates on avionics in the low-performance general aviation aircraft category because they are the major components of the avionics industry. Typical units of detailed study are transponders, transceivers, navigation receivers, and course deviation indicators (CDIs). An examination of the price histories of more than twenty equipment families indicates that unit prices have been and are likely to continue increasing at the Producer Price Index (PPI) rate. This rate of price growth results from a balance between costs rising at the Consumer Price Index (CPI) rate and manufacturing cost reductions made possible through the introduction of new technologies. (Author)

AD-A108 502/6 PC **A06**/MF **A01**
Polytechnic Inst. of New York, Brooklyn. Microwave Research Inst.
Basic Research in Electronics (JSEP).
Annual rept. 1 Apr 80-31 Mar 81,
Arthur A. Oliner. 30 Sep 81, 120p POLY-MRI-1415-81, AFOSR-TR-81-0775
Contract F49620-80-C-0077

This annual report presents a summary of the scientific progress and accomplishments on research projects funded by the Joint Services Electronics Program (JSEP) for the contract period from 1 April 1980 through 31 March 1981. It does not contain information regarding accomplishments on research projects funded in other ways. The Joint Services Electronics Program at the Polytechnic is the core of interdisciplinary research in electronics encompassing programs in the Departments of Electrical Engineering, Physics and Chemistry under the aegis of the Microwave Research Institute. The research encompassed by this program is grouped under three broad categories: Electromagnetics, Solid State and Information Electronics. The detailed projects (work units) comprising the complete program are listed in the Table of Contents. In addition to the progress, we include for each of the work units the publications during the past year resulting from the research, and some of the recent interactions with the DOD or industry or other academic institutions. At the front of this Annual Report we present our Report on Significant Scientific Accomplishments, and at the end we append a comprehensive list of all the journal publications and conference proceedings during the period from August 1, 1980 to the present, arranged alphabetically according to the name of the first author. (Author)

DOE/ET/29305-T1 PC **A08**/MF **A01**
Commonwealth Associates, Inc., Jackson, MI.
Survey of Transmission Line Corridors.
5 Jan 79, 166p
Contract AC05-78ET29305

The intent of this study is to determine the extent of delays experienced in planning and constructing transmission lines in the continental United States. The reasons for the delays are identified for each line studied and their effect on the total electrical system is sought. Data was collected for 136 different lines either recently built or currently under study. Statistics were developed for each line in several categories and comparisons of lines delayed were made by company, area served and generation capacity. From the study presented here it was found that: right-of-way acquisition procedures including condemnation and easement negotiation practices delay more projects than local, state and federal regulatory requirements combined; load growth reductions particularly in the east have reduced the impact of regulatory delays; the south, southeast and southwestern areas of the country experience fewer delays in constructing transmission lines than the more populated states, and the cost for corridor delays was responded to for only 17 of the 142 projects surveyed. By far the most costly delay is the expense of condemning land for transmission right-of-way. (ERA citation 06:004771)

N82-13357/0 PC **A09**/MF **A01**
Westinghouse Electric Corp., Lima, OH. Electric Systems Div.
High Voltage DC Switchgear Development for Multi-kw Space Power System: Aerospace Technology Development of Three Types of Solid State Power Controllers for 200-1100VDC with Current Ratings of 25, 50, and 80 Amperes with One Type Utilizing an Electromechanical Device.
Final Report.
W. W. Billings. Nov 81, 187p NASA-CR-165413, WAED-81-05E
Contract NAS3-21755

Three types of solid state power controllers (SSPC's) for high voltage, high power DC system applications were developed. The first type utilizes a SCR power switch. The second type employes an electromechanical power switch element with solid state commutation. The third type utilizes a transistor power switch. Significant accomplishments include high operating efficiencies, fault clearing, high/low temperature performance and vacuum operation.

PAT-APPL-6-297 524 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
A Simplified Power Factor Controller with Increased Energy Saving Circuit.
Patent Application,
F. J. Nola. Filed 28 Aug 81, 12p N82-12349/8, NASA-CASE-MFS-25323-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A device which controls the power input to an induction motor by controlling the power of the motor is disclosed. Two features of the device increase its sensitivity under conditions where the motor is unloaded in order that full control operation is possible with the device adjusted to operate with the power input just sufficient to sustain motor operation. A feedback circuit comprising of a resistor, which feeds back to a summing junction from a signal point at which a triac control signal appears. The requirement that motor current be directly sampled in the process of determining the power factor of the power input to a motor is eliminated.

PB82-137472 Not available NTIS
National Bureau of Standards, Washington, DC.
A Critical Study of Emission and Susceptibility Levels of Electrically Small Objects from Tests Inside a TEM Cell.
Final rept.,
I. Sreenivasiah, D. C. Chang, and M. T. Ma. 1981, 9p
Pub. in Proceedings of IEEE International Symposium on Electromagnetic Compatibility (1981), Boulder, Colorado, August 18-20, 1981, p499-507.

An electrically small radiating source of arbitrary shape may, to a first order, be modeled by an equivalent dipole system consisting of three orthogonal electric dipoles and three orthogonal magnetic dipoles each excited with arbitrary amplitude and phase. Determination of the individual electric dipole moments and the cross-components of such an equivalent dipole system for the emission case by tests inside a TEM cell, was described in an earlier work by Sreenivasiah, Chang and Ma, assuming a constant TEM modal field distribution in the space occupied by the test object. A method of accounting for the first-order variation in the TEM modal field distribution is presented in this report. This involves the inclusion of electric quadrupole terms in the modeling of the test object. Using the reciprocity principle, the same method is extended to the determination of susceptibility levels of electrically small test objects. Some experimental results for the susceptibility test, demonstrating the importance of the quadrupole terms, are presented.

PB82-143058 PC **A05**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Design and Protection of 400 kV Transmission Lines and Substations Held at New Delhi on 17-19 April 1978. Volume I: Technical Papers on Design of Substations.
Mar 78, 91p PUB-131-VOL-1
See also Volume 2, PB82-143066.

Contents:
- Design aspects of EHV substations;
- Insulation level and clearances in 400 kV substations;
- Construction, planning and erection of 400 kV substation of U.P. state electricity board;
- Transformers for 400 vK systems;
- Selection of 400 kV circuit breakers and isolators;
- Design and testing of insulators and related fittings for 400 kV transmission lines and substations;
- Consideration of short circuit forces in mechanical design of 400 kV substation columns and beams;
- Earthing of EHV substations;
- and Reliability--A major criterion in selection of switchgear for EHV systems.

PB82-143066 PC **A09**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Design and Protection of 400 kV Transmission Lines and Substations. Volume II: Technical Papers on Design of Trnsmission Lines.
Mar 78, 178p PUB-131-VOL-2
See also Volume 3, PB82-143074.

Contents:
- Design of towers for 400 kV;
- Insulation design of 400 kV transmission lines;
- Switching surge and dynamic overvoltages on Beas 400 kV system;
- Compensation requirements of EHV long lines--special reference to 400 kV;
- Determination of ACSR 'creep' for consideration in future 400 kV transmission lines;
- Surface gradient calculation for bundle conductors in 400 kV transmission line;
- Features of towers and foundations of 400 kV lines in Uttar Pradesh;
- Selection of conductor for 400 kV lines of Uttar Pradesh;
- Development of insulator-hardware for 400 kV transmission lines;
- Development of bundle spacers for 400 kV lines;
- Selection of groundwire for 400 kV transmission lines;
- Aeolian vibration of high voltage transmission lines:
- cause, effects and remedies:
- Vibration control techniques in EHV bundled transmission lines with special reference to 400 kV Dehar-Panipat Line;
- Radio noise from EHV lines--A practical approach;
- Tension stringing of EHV transmission lines;
- Stringing of bundle conductors on 400 kV Lines in Uttar Pradesh;
- The 400 kV transmission system--Some operational and planning aspects;
- Protection of EHV bundled conductor transmission lines from vibration--Some possible solutions;
- Limiting fault current in 400 kV system;
- Application of series capacitors;
- Thyristor-controlled static shunt compensators.

PB82-143074 PC **A05**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Design and Protection of 400 kV Transmission Lines and Substations Held at New Delhi on 17-19 April 1978. Volume III: Technical Papers on Protection of Transmission Lines and Substations.
Mar 78, 92p PUB-131-VOL-3
See also Volume 4, PB82-143082.

Contents:
- Protection of 400 kV A.C. systems;
- Protection of extra high voltage transmission lines of rating 420 kV;
- Digital protection and control of power systems;
- Bus protection for 400 kV substation;
- PLC systems for teleprotection;
- Transmission of teleprotection signals for high speed direct tripping on Dehar-Panipat 400 kV line under Beas Project;
- Neutralizing transformer--a protective device for communication circuits entering power stations;
- Protection of control cables against induced voltages in EHV substations;
- Switching surge calculations in EHV systems;
- and Modern high-speed-protection of UHV and EHT transmission lines.

PB82-143082 PC **A06**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Design and Protection of 400 kV Transmission Lines and Substations. Volume IV: General Reports and Discussions.
Nov 79, 125p PUB-131-VOL-4
See also Volume 1, PB82-143058.

Presents the discussions on the papers presented at the symposium.

PB82-145681 PC **A07**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings Forty-Sixth Research Session Held at Trivandrum, Kerala on 16-19 November, 1977. Volume VI--Power: Technical Papers on Substations, Protection, and General.
Oct 77, 137p PUB-129-VOL-6

Contents:
- Recent trends in the design and development of EHV/UHV substation equipment;
- E.H.V. mini substations;
- Substation equipment insulation reduction and insulation coordination for the voltage range 66 kV-220 kV for earthed systems;
- Selection of the number and location of lightning arresters for multi circuit substations;
- Potential rise on grounding grids at substations during fault conditions and improvement from remedial measures;
- Control of ground potential gradients at modern high voltage substations;
- Insulating oil--importance and significance of tests;
- Expriences with dissolved gas analysis for large power transformers in Tata electric companies;
- Problems connected with maintenance of pneumo-hydraulic control mechanisms in oil minimum circuit breakers;
- A new relay with linear characteristic for the protection of high voltage transmission lines;
- High speed protection of power transformers using analogue cross-correlation techniques;
- Protection of large size steam turbine generators;
- Multipurpose solid state voltage sensor and its applications in protective schemes;
- Bridging the gap between load demand and installed capacity--ways and means;
- Protection of H. T. and L. T. distribution lines and distribution transformers;
- and Reliability data base for power systems.

PB82-145707 PC **A07**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings Forty-Seventh Research Session Held at Hubli-Dharwar, Karnataka on 20-24 November, 1978. Volume VI--Power: Technical Papers on Transmission, and Substations.
Oct 78, 143p PUB-132-VOL-6

Contents:

Study of impact of a 500 MW generating unit tripout on U.P. system;
Radio interference measurements on high voltage lines;
Experience with 34 tower tests at the tower testing station of Central Power Research Institute, Bangalore;
Aeolian vibration problem in overhead transmission lines--development of specifications (ISS);
Vibration bending amplitude and strain in transmission lines;
Successful and practical achievements in overcoming pollution difficulties of insulators;
Pollution performance of composite insulators;
Modern hot line maintenance techniques;
System model of thermal behavior of transformer;
A dielectric loss and insulation power factor test set;
Automatic dielectric strength detector device for transformer oil;
Prototype aseismic tests on minimum oil circuit breaker type:
HLR 245/250-B;
Selection of the number and location of lightning arresters for multi-circuit substations:
II;
Utility of HVDC testing in preventing maintenance of EHV lightning arresters;
Effect of soil ionization on resistance of concentrated grounds;
To evolve an effective earth mat--design for EHT substation grounding;
and Revision and standardization of earthing practices.

PB82-146036 PC **A02**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
The Role of Simulation in Power System Transient Stability Assessment,
B. S. Bennett. Jan 80, 13p CONTROL SYSTEMS CENTRE-478

This is a preliminary investigation of the problem of transient stability assessment in power system networks when examined from the point of view of simulation. It is well known that for simulation to be of any use in the area of power system network stability analysis, simulation solution speeds have to be orders of magnitude faster than real time. The use of digital computation for this purpose puts many difficulties in the way of attaining such goals and this report seeks to outline some of these difficulties and their importance in relation to the stability assessment problem.

PB82-859554 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Direct Current Motor Control. 1970-January, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 82.
Jan 82, 161p

This bibliography of world literature considers speed and position control systems for DC motors. Digital control, regenerative braking and synchronous control are discussed. Planning, design, and economic considerations in design and set-up of control circuits and systems for DC motors in machine and process control applications are included. (Contains 179 citations fully indexed and includes a title list.)

UCRL-52954 PC **A12**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Characterization of Errors Inherent in System EMP Vulnerability Assessment Programs.
R. M. Bevensee, H. S. Cabayan, F. J. Deadrick, L. C. Martin, and R. W. Mensing. 1 Oct 80, 253p
Contract W-7405-ENG-48

The overall objectives of the DNA-funded program at LLL are to provide a measure of accuracy of currently used EMP vulnerability assessment methodology. In addition, system tools are to be provided to improve the confidence in assessment efforts, which in turn will result in improved confidence in establishing hardening requirements. During Phase I, assessment techniques currently used by the EMP community are surveyed and the sources of uncertainty are identified. Typical data are presented for quantifying the major sources of uncertainty in all phases of the assessment effort. During this phase, a statistical methodology to assess the impact of uncertainty on the survivability of a system has been partially validated with a simple system test. (ERA citation 06:005241)

9D. Information Theory

AD-A108 605/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Signal Reconstruction from Fourier Transform Phase or Magnitude,
Alan V. Oppenheim. 1980, 19p
Contract N00015-75-C-0951, Grant NSF-ECS80-07102
Pub. in Proceedings of the NSF Workshop on Digital Signal Processing, La Spezia (Italy), 27-29 Aug 81 p131-145.

No abstract available.

N82-13776/1 PC **A07**/MF **A01**
Ecole Nationale Superieure des Telecommunications, Paris (France).
Adaptive Equalization Algorithms for a Dispersive Channel Algorithms d'Egalisation Adaptative d'UN Canal Dispersif.
Ph.D. Thesis.
H. Sari. Oct 80, 134p ENST-E-80012
Text in French.

The equalization of a numerical transmission channel is studied, centering on algorithms which control adaptation of the equalizer to an unknown channel that may be slowly time variable. Two problems, i.e., tracking a nonstationary channel, and identification of a stationary channel, are considered. Two equalizers are compared: a linear nonrecursive one, and a recursive one with a decision loop. Algorithms are described and simulation results show their performance. An auto-orthogonalizing algorithm is treated in greater detail. Two alternative algorithms are then proposed. The first gives rapid convergence and is not sensitive to dispersion of the values of the received signal correlation matrix. It is obtained by replacing the Toeplitz matrix for the gain of the auto-orthogonalizing algorithm by a circulation matrix that is asymptotically equivalent to it. The algorithm is suitable for both equalizers discussed. The second algorithm proposed is noniterative; it is only well-adapted to the linear nonrecursive equalizer.

9E. Subsystems

AD-A108 174/4 PC **A04**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Antenna (Selected Articles),
V. I. Zamyatin, L. G. Korniyenko, A. S. Yevseyev, V. P. Kul'tsep, and N. A. Bey. 4 Nov 81, 63p Rept no. FTD-ID(RS)T-0940-81
Edited trans. of Antenny (USSR) n15 p31-79 1972.

No abstract available.

AD-A108 175/1 PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Antenna (Selected Articles),
O. G. Vendik, and L. V. Rizhkova. 6 Nov 81, 31p Rept no. FTD-ID(RS)T-1134-81
Edited trans. of Antenny (USSR) n10 p3-26 1971, by Victor Mesenzeff.

No abstract available.

AD-A108 176/9 PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
One Class of Optimum Linear Equally Spaced Antenna Arrays with Summary or Difference Radiation Patterns,
B. M. Minkovich. 6 Nov 81, 32p Rept no. FTD-ID(RS)T-1135-81
Edited trans. of Antenny (USSR)p3-17 1970 by Gale M. Weisenbarger.

No abstract available.

AD-A108 181/9 PC **A04**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
Measurements of Antenna Pulse Response.
Paul R. Caron. Jul 81, 53p Rept no. RADC-TR-81-224

A technique for obtaining the pulse response of antennas utilizing steady-state measurements on a Scientific-Atlanta 2020 antenna range is described. The method involves making wideband frequency measurements, both amplitude and phase, centered about the defined carrier frequency and transforming the data to low frequency. This result is multiplied by the complex Fourier Transform of a pulse (the modulating pulse) utilizing Fast-Fourier-Transforms and the inverse FFT yields the desired pulse response. All computations are done on the 2020 System Computer (Hp 21 MX Series 1000). Techniques for eliminating the frequency response of system components are described. The technique essentially treats the antenna on a 'transfer function' basis. Therefore, results are presented on the response of a transmission line system and this is compared with theory. Finally, results on the pulse response of various antennas are presented. (Author)

AD-A108 204/9 PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Antenna (Selected Articles),
L. V. Ryzhkova. 2 Nov 81, 29p Rept no. FTD-ID(RS)T-0993-81
Edited trans. of Antenny (USSR), n8 p28-46 1970, by Bernard L. Tauber.

No abstract available.

AD-A108 247/8 PC **A21**/MF **A01**
General Electric Co., Pittsfield, MA. Electronic Systems Div.
Electrical Characterization and Specification of Special Purpose Linear Microcircuits.
Final technical rept. 24 Aug 78-1 Oct 80,
John S. Kulpinski, Louis Carrozza, Theodore Simonsen, Donald Van Alstyne, and Larry Deluca.
Jun 81, 494p RADC-TR-81-74
Contract F30602-78-C-0195

This technical report is divided into chapters covering specific device types with electrical characterization, test methodology and results discussed. The following device types/familites were characterized with the resulting slash sheets depicted: Adjustable Positive Voltage Regulators; Adjustable Negative Voltage Regulators; BiFet Operational Amplifiers; Multiple BiFet Operational Amplifiers; Voltage References; Programmable Voltage References; 12 Bit A/D Converters; 12 Bit D/A converters; and Sample/Hold Amplifiers. Samples of data sheets, histograms, and plots, are included in this report.

AD-A108 276/7 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Restructurable VLSI Program.
Semiannual technical summary rept. 1 Apr 80-31 Mar 81,
Peter E. Blankenship. 31 Mar 81, 61p ESD-TR-81-153
Contract F19628-80-C-0002, ARPA Order-3797

The main objective of the Lincoln Restructurable Very Large Scale Integration (RVLSI) Program is to develop methodologies for designing whole-wafer-scale systems with complexities approaching a million gates. In our approach, we envisage a modular style of architecture comprising an array of cells embedded in a regular interconnection matrix. Ideally, the cells should consist of only a few basic types. The interconnect matrix is a fixed pattern of metal lines augmented by a complement of programmable switches or links. Conceptually, the links could be either volatile or nonvolatile. They could be of an electronic nature such as a transistor switch, or could be permanently programmed through some mechanism such as a laser. The present main thrust of the current RVLSI Program is toward laser-formed interconnect. The link concept offers the potential for a highly flexible, restructurable type of interconnect technology which could be exploited in a variety of ways. For example, logical cells or subsystems found to be faulty at wafer probe time could be permanently excised from the rest of the wafer. The flexible interconnect could also be used to 'jump around' faulty logic and tie in redundant cells judiciously scattered around the wafer for this purpose. Also, the interconnect could be tailored to a specific application in order to minimize electrical degradations and performance penalties caused by unused wiring.

AD-A108 286/6 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
A Microcircuit for Space Applications.
Memorandum rept.,
S. R. Highley. 4 Dec 81, 9p Rept no. NRL-MR-4672

The need to reduce the volume of an electronic circuit package led to the development of a unique hybrid circuit package. Several problems were encountered during design, construction, and testing; and solved, producing a functional design with the final system package size about 1/5 that required for standard packaging.

AD-A108 424/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
A Pulse-Forming Network for Particle Path Visualization.
Technical memo.,
Kenneth W. McAlister. Nov 81, 18p NASA-A-8671, NASA-TM-81311, USAAVRADCOM-TR-81-A-21

A procedure is described for visualizing nonsteady fluid flow patterns over a wide velocity range using discrete nonluminous particles. The paramount element responsible for this capability is a pulse-forming network with variable inductance that is used to modulate the discharge of a fixed amount of electrical energy through a xenon flashtube. The selectable duration of the resultant light emission functions as a variable shutter so that particle path images of constant length can be recorded. The particles employed as flow markers are hydrogen bubbles that are generated by electrolysis in a water tunnel. Data are presented which document the characteristics of the electrical circuit and establish the relation of particle velocity to both section inductance and film exposure. (Author)

AD-A108 483/9 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Electron Physics Lab.
Simulation of Pulsed Impatt Oscillators and Injection-Locked Amplifiers.
Interim rept. Jun 80-Feb 81,
R. K. Mains, G. I. Haddad, and D. F. Peterson. Oct 81, 45p TR-151, AFWAL-TR-81-1177
Contract F33615-77-C-1132

A method for simulating the dynamic behavior of pulsed IMPATT oscillators using a quasi-static approximation is presented. The method used to characterize the IMPATT diode is explained. A particular circuit model is used which models the cylindrical cavity power combining circuit. The overall device-circuit interaction technique is outlined. Simulation results for a high-low, single-drift X-band GaAs IMPATT are presented. The method presented here can be employed for any type of IMPATT device. The pulsed oscillator properties of double-drift IMPATT diode structures are presently being investigated. (Author)

AD-A108 512/5 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Design of a Highly Linear Closed-Loop FMCW Sweep Generator.
Technical rept.,
Peyton Z. Peebles, Jr. 8 Aug 79, 38p DRSMI-RE-82-1-TR, SBI-AD-E950 181
Contract DAAG29-76-D-0100
Prepared in cooperation with Tennessee Univ., Knoxville. Supersedes rept. no. DRSMI-RE-79-78-TR dated 8 Aug 79.

The basic task documented herein was to design and analyze a closed-loop method for linearizing the 'linear' frequency-modulated (FM) transmission from a millimeter-wave transmitter at 35 GHz. The basic design was then to be constructed and evaluated as far as possible within existing time and equipment availability constraints. (Author)

AD-A108 566/1 PC **A06**/MF **A01**
California Univ., Los Angeles.
Theoretical and Experimental Investigation of Some Slot Antenna Array Problems.
Final technical rept. 1 Feb 79-7 Mar 81,
R. S. Elliott, N. G. Alexopoulos, G. Franceschetti, P. J. Contoyannis, and P. Park. Oct 81, 122p RADC-TR-81-232
Contract F19628-79-C-0069

The effect of metallic fences on mutual coupling between slots of a slot antenna is studied. A model solution has been obtained whereby the fence is modelled as a thin half elliptic cylinder. This model allows for thickness to be taken into account and provides exact solutions to mutual impedance computations. The geometrical theory of diffraction has been adopted to analyze an exceedingly thin fence, when the slot antennas are not too close to the fence. Design procedures for longitudinal and traverse stripline-fed slots have been developed. A design procedure for such slot arrays requires knowledge of the mutual coupling relation as well as the self-impedance properties of a slot. Preliminary design equations are reported in this document. (Author)

AD-A108 694/1 PC **A04**/MF **A01**
CNR, Inc., Needham, MA.
Wideband HF Channel Analyzer.
Final technical rept. Mar 79-Jan 81,
George E. Peo, and Phillip A. Bello. Jan 81, 56p
Contract N00173-79-C-0090

This document is a final report describing a wideband (1 MHz) HF channel analyzer. The Wideband HF Channel Analyzer is a digital signal processor designed to be used for wideband high-frequency radio channel measurement studies. The analyzer contains analog-to-digital converters, a digital pre-processor, a digital correlator array, a digital post-processor and two computer interfaces. To perform a channel measurement experiment, a transmitter at a remote site broadcasts a pseudo-random number (PN) sequence modulated onto a suitable carrier. After complex demodulation at the receiver, the analyzer measures channel delay by correlating the received sequence with its internal reference. Two modes of operation are provided. The Sounder Mode is used to obtain a preliminary characterization of the channel. The Prober Mode is used to more accurately measure the channel delay characteristics. (Author)

AD-A108 732/9 PC **A02**/MF **A01**
Royal Signals and Radar Establishment, Malvern (England).
Impedance of Monopole Antennas on Vehicles by Moment Methods.
Memorandum rept.,
D. J. Brammer. 23 Sep 81, 12p RSRE-MEMO-3414, DRIC-BR-81100

The moment method program NEC-1 was used to investigate the accuracy with which antenna impedance can be calculated by moment methods for monopole antennas on conducting vehicles. Both wiregrid and surface patch methods were used. It is shown that providing certain constraints are adhered to, reasonably accurate results are possible for antennas that are not too thick. (Author)

LA-8537-SR PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Gyrocon Radio-Frequency-Generator Project for FY-78 and -79.
P. J. Tallerico, and J. E. Rankin. Sep 80, 60p
Contract W-7405-ENG-36

The gyrocon is a high-power, high-efficiency amplifier that operates by deflection modulation of an electron beam. The bunching is better than that in a klystron, especially for very high powers and UHF frequencies, so the overall efficiency and the maximum output power can be higher than in a klystron. The present theory includes the effects of large signals, space charge, and finite beam size. The equations of motion are relativistically correct, and the space-charge fields are correct to first order in v/c. The theory is derived and a computer code to solve these equations is discussed. The code is then used to obtain several specific examples of gyrocon designs that have significant advantages over klystrons or gridded tubes in the 0.2- to 1.0-GHz frequency range. Several embodiments of the gyrocon are possible: the radial style and the spherical style are discussed in this report. The radial style has a bender magnet to increase the deflection of the beam, whereas the spherical gyrocon does not employ the bender magnet. The optimum frequency range for the spherical gyrocon is from 1.0 to 2.5 GHz. (ERA citation 06:005192)

N82-13341/4 PC **A04**/MF **A01**
Bundesministerium der Verteidigung, Bonn (Germany, F.R.).
Experimental and Theoretical Investigations with Laboratory Models of Phased Array Antenna.
H. Lueg. 1979, 70p BMVG-FBWT-79-21
In German; English Summary.

Phased arrays in the X band frequency range are studied. A theory is introduced, leading to the calculation of a conformal array of waveguide-fed aperture antennas. To test the theory, an antenna model was constructed. Printed antennas were considered for array application. Simple resonant, microstrip antennas were investigated. Theory and measurement agree. Dynamic theory leads to improvement in the design of mutually coupled active modules. Beam scanning of an active spherical antenna array was examined with respect to these results. An antenna array was set up with eight active elements and tested under computer control. For application of pulsed active modules in phased array antennas, measurement and compensation of frequency chirp are demonstrated feasible.

N82-13369/5 PC **A04**/MF **A01**
Siemens A.G., Munich (Germany, F.R.).
Further Developments in Integrated Circuit Assembling Technology.
Final Report.
H. Ullrich. Dec 80, 62p BMFT-FB-T-80-179, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Recent developments aiming at full automation in the assembling technology of plastic encapsulated integrated circuits (IC) are described, covering die separation, chip adhesion and wire bonding. For IC die separation in individual chips, a diamond sawing procedure which replaces the traditional scratch and break technique is proposed. Die attachment by means of a silver-filled adhesive was extended to MOS and power devices. A half-automated universal chip adhesion machine was designed and tested. A positioning system based on chip edge pattern recognition was developed. The prototype of a fully automated wire bonding system was successfully tested. The technical and economical advantages of these improved technologies are discussed.

N82-13370/3 PC **A05**/MF **A01**
Centre d'Etudes et de Recherches, Toulouse (France). Dept. d'Etudes et de Recherches en Automatique.
Validation, Modeling, and Computer Assisted Design Program for Power Converters Validation, Modelisation et Logiciel de Conception Assistee des Convertisseurs de Puissance.
Final Report.
M. Clique, and A. J. Fossard. Jun 81, 82p ESTEC/DERA-8/7208, ESA-CR(P)-1454
Contract ESTEC-3652/78/NL-AK(SC)
Text in French.

Work carried out in order to determine the dynamic performance of dc/dc converters is summarized. The modeling of limit cycling current control as well as maximum current control (buck; boost) is briefly discussed, emphasizing the adaptability of the method. The computerized design program used in describing the systems in which the converters operate is mentioned, again pointing out its flexibility. The recording and processing of measurement data from breadboard model converters is then reported on. Least squares was employed as an identification method with all converters. Measured results and predicted results agree well up to approximately 2 or 3 KHz. At higher frequencies the introduction of parasite effects into the program and the precise modeling of certain complex filters remains problematic.

N82-13957/7 PC **A04**/MF **A01**
Siemens A.G., Munich (Germany, F.R.).
Multifunctions - Liquid Crystal Displays.
Final Report.
M. Bechteler. Dec 80, 68p BMFT-FB-T-80-181, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Large area liquid crystal displays up to 400 cm square were developed capable of displaying a large quantity of analog and digital information, such as required for car dashboards, communication systems, and data processing, while fulfilling the attendant requirements on view tilt angle and operating temperature range. Items incorporated were: low resistance conductive layers deposited by means of a sputtermachine, preshaped glasses and broken glassfibers, assuring perfect parallellism between glass plates, rubbed plastic layers for excellent electrooptical properties, and fluorescent plates for display illumination in bright sunlight as well as in dim light conditions. Prototypes are described for clock and automotive applications.

PAT-APPL-6-315 585 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Multiple-Beam, High-Power, Precision Pointing Antenna System.
Patent Application,
K. E. Woo, and P. W. Cramer, Jr. Filed 30 Oct 81, 16p N82-12345/6, NASA-CASE-NPO-15406-1
Contract NAS71-00
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An antenna with a plurality of beams that can be electronically steered simultaneously in unison is described. The beams may be steered independently. A relatively small phased array of antenna elements feeding a near field dual reflector system is used to magnify the aperture of the feed array to that of the main reflector thereby providing high gain. The main reflector and the subreflector are shaped reflectors which may be confocal paraboloids having nominally the some focal length to diameter ratio, although the subreflector may be oversized. The array feed is placed so that the subreflector is in the near field of feed.

PAT-APPL-6-323 835 PC **A03**/MF **A01**
Department of the Army, Washington, DC.
Lossy Matching for Broadbanding Low Profile Small Antennas.
Patent Application,
Charles M. DeSantis. Filed 23 Nov 81, 31p AD-D009 047/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A low-profile survivable antenna suitable for military use is described. Despite its small size, which might be one tenth of a wavelength, the antenna has reasonable transmission range for these applications. Very little operator attention is needed in operation, since a special matching circuit within the antenna network enables effective impedance matching, over a 3:1 frequency range, without necessity of switching to different matching circuits over different frequency bands. By including resistive components along with other passive inductive or capacitive elements, the reactance of the single matching circuit is made to effectively compensate the antenna's impedance over the entire frequency range. The impedance of the circuit has a decreasing positive reactance which compensates for the decreasing negative reactance, with frequency, of the antenna. Although the transmission efficiency of the matched antenna network is somewhat diminished by resistive losses, it is still satisfactory, and band switching with this matching circuit is completely eliminated. By including a slender whip screwed into the top, the range can be doubled with no further changes. The matching techniques to be described are most easily realized in the HF through VHF range (1-200 MHz).

PATENT-4 287 519 Not available NTIS
Department of the Navy, Washington, DC.
Multi-Mode Luneberg Lens Antenna.
Patent,
Kazumasa Doi. Filed 4 Apr 80, patented 1 Sep 81, 7p AD-D009 027/4, PAT-APPL-6-137 177
Supersedes PAT-APPL-6-137 177, AD-D007 168.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to an antenna system having a multiple of antenna feeds to drive a microwave lens, composed primarily of a Luneberg lens and a metallic ground plane upon which are mounted three antenna feeds and a shorted stub (or four bent-stub coaxial feeds). The antenna system uses a common aperture to provide antenna performance for the three separate feeds, conserving space that would normally be required for three separate high gain antennas.

PB82-137464 Not available NTIS
National Bureau of Standards, Washington, DC.
Broadband Orthogonal Array Antenna System Microprocessor Control and Computation.
Final rept.,
W. D. Bensema. 1981, 3p
Pub. in Proceedings of IEEE International Symposium on Electromagnetic Compatibility (1981), Boulder, Colorado, August 18-30, 1981, p43-45.

A broadband orthogonal array antenna system and associated control circuitry have been designed to reduce the man hours required when making spectrum occupancy studies. Effective omnidirectional coverage is obtained by rapidly switching among arrays of conventional antennas; resultant field strengths are calculated and recorded using a microprocessor. The system is man pack portable, covers from 10 kHz to 18 GHz and is capable of recording fields up to 100 V/meter. The system has demonstrated a factor of 50 to 1 reduction in man hours required to carefully measure and record spectrum occupancy over conventional non-automated searching. This paper concentrates on the microprocessor computation, control, display, print out and convenience features. A companion paper discusses antenna systems and rf switching.

PB82-140856 Not available NTIS
National Bureau of Standards, Washington, DC.
Synthesized Isotropic Pattern Antennas for EM Field Measurements.
Final rept.,
G. R. Reeve. 1981, 7p
Pub. in Proceedings of IEEE International Symposium Electromagnetic Compatibility, Boulder, Colorado, August 18-20, 1981, p36-42.

This paper describes a set of EM field measurement antennas covering the range of 10 kHz to 1 GHz which, under microprocessor control, synthesize an isotropic response. Another antenna, covering the frequency range of 1 GHz to 18 GHz, synthesizes a wide vertical angle, omnidirectional, response for signals of any linear, and one circular, polarization. These antennas together with an appropriate instrumentation system allow rapid acquisition of ambient field strength data.

PB82-140930 Not available NTIS
National Bureau of Standards, Washington, DC.
Optimized Wavelength-Sized Scalar Horns as Antenna Radiation Standards.
Final rept.,
A. J. Estin, C. F. Stubenrauch, A. G. Repjar, and A. C. Newell. 1981, 5p
Pub. in Proceedings of Electrical and Electronic Measurement and Test Instrument Conference and Expo., Ottawa, Canada, September 22-24, 1981, EEMTIC '81 Digest, 81CH1710-3, p64-68 1981.

The properties of beamwidth, directivity, and polarization of wavelength-size scalar horns are analyzed and optimized theoretically and confirmed experimentally to determine the usefulness of such horns as standards. Agreement between theoretical predictions and measurements was good.

PB82-144072 Not available NTIS
National Bureau of Standards, Washington, DC.
Spherical-Wave Source-Scattering-Matrix Analysis of the Mutual Coupling between Two Antennas.
Final rept.,
Richard L. Lewis. 1981, 4p
Pub. in Proceedings of AP-S International Symposium 1981, Los Angeles, California, June 16-19, 1981, p261-264.

Expressions are given for the mutual coupling between two antennas in terms of each antenna's spherical-wave source-scattering-matrix representation. A comparison to the classical scattering matrix definition is given in sufficient detail to permit conversion back and forth between source-scattering-matrix representation and the classical scattering matrix representation. The paper concludes with expressions for the transmission formulas, showing the different expressions corresponding to changes in direction of propagation. However, if the two antennas are both reciprocal, then the two-port scattering matrix is a symetric matrix.

PB82-861014 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plasma Display Panels. 1975-January, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 82.
Jan 82, 271p

Citations in this bibliography cover the design, fabrication, characteristics, performance, and operation of various types of plasma panel displays and related technology. A wide variety of applications are cited. Some attention is give to research and development as well as to the state-of-the-art for plasma displays. (Contains 291 citations fully indexed and includes a title list.)

PB82-861162 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
High Density Packaging : Electronics. 1970-January, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 82.
Jan 82, 137p

The packaging of very large scale integrated circuits is discussed. Emphasis is placed on the reliability of the circuitry as well as built-in redundancy. Methods of on-line testing by means of accessible test points are also included. Microelectronic devices for switching systems, navigational aids and modern information processing are featured. (Contains 109 citations fully indexed and includes a title list.)

PB82-861170 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
High Density Packaging : Electronics. 1972-January, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Jan 82.
Jan 82, 132p
Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

The packaging of very large scale integrated circuits is discussed in the cited reports. Emphasis is placed on the reliability of the circuitry as well as built-in redundancy. Methods of on-line testing by means of accessible test points are also included. Packaging system applications include helicopter radar systems, tactical communications, air traffic control, and space exploration. Sensors and detectors for a wide variety of wavelengths based on packaged electronics are included. (Contains 127 citations fully indexed and includes a title list.)

PB82-861188 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
High Density Packaging : Electronics. 1970-January, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 82.
Jan 82, 106p

The packaging of very large scale integrated circuits is discussed in the cited reports. Emphasis is placed on the reliability of the circuitry as well as built-in redundancy. Methods of on-line testing by means of accessible test points are also included. Automated systems for assembly and packaging for large scale integrated circuits are described. The impact of large scale circuits on future microprocessor evolution is also discussed. Applications of these systems to lithography and projection printing are included. (Contains 115 citations fully indexed and includes a title list.)

SAND-80-0420C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Delay Modeling in Logic Simulation.
J. M. Acken, and L. H. Goldstein. 1980, 9p CONF-801005-1
Contract AC04-76DP00789
International conference on circuits and computers, Port Chester, NY, USA, 1 Oct 1980.

As digital integrated circuit size and complexity increases, the need for accurate and efficient computer simulation increases. Logic simulators such as SALOGS (SAndia LOGic Simulator), which utilize transition states in addition to the normal stable states, provide more accurate analysis than is possible with traditional logic simulators. Furthermore, the computational complexity of this analysis is far lower than that of circuit simulation such as SPICE. An eight-value logic simulation environment allows the use of accurate delay models that incorporate both element response and transition times. Thus, timing simulation with an accuracy approaching that of circuit simulation can be accomplished with an efficiency comparable to that of logic simulation. 4 figures. (ERA citation 05:034058)

SAND-80-0839C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Radiation-Hard Silicon Gate Bulk CMOS Cell Family.
C. F. Gibbon, D. H. Habing, and R. S. Flores. 1980, 7p CONF-800703-2
Contract EY-76-C-04-0789
Annual conference on nuclear and space radiation effects, Ithaca, NY, USA, 15 Jul 1980.

A radiation-hardened bulk silicon gate CMOS technology and a topologically simple, high-performance dual-port cell family utilizing this process have been demonstrated. Additional circuits, including a random logic circuit containing 4800 transistors on a 236 x 236 mil die, are presently being designed and processed. Finally, a joint design-process effort is underway to redesign the cell family in reduced design rules; this results in a factor of 2.5 cell size reduction and a factor of 3 decrease in chip interconnect area. Cell performance is correspondingly improved. (ERA citation 05:029335)

SAND-80-0843C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
SEM Technique for Experimentally Locating Latch-Up Paths in Integrated Circuits.
P. V. Dressendorfer, and M. G. Armendariz. 1980, 4p CONF-800703-1
Contract EY-76-C-04-0789
Annual conference on nuclear and space radiation effects, Ithaca, NY, USA, 15 Jul 1980.

A technique is presented for using the scanning electron microscope (SEM) in the electron-beam-induced current (EBIC) mode to delineate latch-up paths in CMOS ICs. In the EBIC mode, the current produced by the collection and separation of the electron-beam-generated electron-hole pairs in the space charge regions of the device is measured and used to form an image. Since the collection of these carriers is dependent on space charge region width (and thus junction potential), anything that alters the depletion layer width will affect the collection efficiency. In a latch condition the junctions involved in the latch will be biased differently from those which are not, and thus the EBIC signal from those regions should be measurably different. (ERA citation 05:029556)

UCRL-84640 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
DASLL: An Automatic Printed Circuit Board Layout System.
W. G. Magnuson, Jr. 1980, 8p CONF-801005-2
Contract W-7405-ENG-48
International conference on circuits and computers, Port Chester, NY, USA, 1 Oct 1980.

DASLL stands for Design Automation System at Lawrence Livermore and is a system of computer programs to automatically lay out printed circuit boards. The focus has been on two-sided PCB fabrication aids; primarily drill tape, documentation, and artwork generation (including etch, silkscreen, and drill schedule artwork). Limited four-layer PCBs are also possible with the program. DASLL can be used in either batch-interactive or batch made of operation by technicians, draftsmen, designers, or engineers. Flexibility in being able to accomodate a diversity of trimline geometries and component shapes and placements was a goal in the design of the software. The system is also very flexible in its capability to deal with physical design rules. A principal objective for the system has been low-volume, quick turnaround response for low and medium density custom printed circuit boards. (ERA citation 05:032705)

10. ENERGY

CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A108 426/8 PC **A02**/MF **A01**
Genera' Accounting Office, Washington, DC. Energy and Minerals Div.
Anthracite Coal Supply for the 1981-1982 Winter.
18 Sep 81, 15p Rept no. GAO/EMD-81-141

This report focuses on some of the problems affecting the anthracite industry and consumers in the northeastern States, State and industry actions since the 1980-81 shortage, and the outlook for the winter of 1981-82. It also includes information on anthracite exports to foreign countries and the Department of Defense (DOD) facilities in the Federal Republic of Germany, Federal research and development efforts to use anthracite in industrial boilers, and the actions the State of Pennsylvania has taken to encourage the use of anthracite in municipal buildings.

N82-13495/8 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Dish Stirling Solar Receiver Combustor Test Program.
C. P. Bankston, and L. H. Back. 15 Aug 81, 45p NASA-CR-165017, JPL-PUB-81-23
Contracts NAS7-100, DE-AI01-81ET-20307

The operational and energy transfer characteristics of the Dish Stirling Solar Receiver (DSSR) combustor/heat exchanger system was evaluated. The DSSR is designed to operate with fossil fuel augmentation utilizing a swirl combustor and cross flow heat exchanger consisting of a single row of 4 closely spaced tubes that are curved into a conical shape. The performance of the combustor/heat exchanger system without a Stirling engine was studied over a range of operating conditions and output levels using water as the working fluid. Results show that the combustor may be started under cold conditions, controlled safety, and operated at a constant air/fuel ratio (10 percent excess air) over the required range of firing rates. Furthermore, nondimensional heat transfer coefficients based on total heat transfer are plotted versus Reynolds number and compared with literature data taken for single rows of closely spaced tubes perpendicular to cross flow. The data show enhanced heat transfer for the present geometry and test conditions. Analysis of the results shows that the present system meets specified thermal requirements, thus verifying the feasibility of the DSSR combustor design for final prototype fabrication.

N82-13505/4 PC **A02**/MF **A01**
Paragon Pacific, Inc., El Segundo, CA.
Development Report: Automatic System Test and Calibration (ASTAC) Equipment.
Final Report.
R. J. Thoren. Jul 81, 25p NASA-CR-165403, DOE/NASA/0203-1
Contracts DEN3-203, DE-AI01-76ET-20320

A microcomputer based automatic test system was developed for the daily performance monitoring of wind energy system time domain (WEST) analyzer. The test system consists of a microprocessor based controller and hybrid interface unit which are used for inputing prescribed test signals into all WEST subsystems and for monitoring WEST responses to these signals. Performance is compared to theoretically correct performance levels calculated off line on a large general purpose digital computer. Results are displayed on a cathode ray tube or are available from a line printer. Excessive drift and/or lack of repeatability of the high speed analog sections within WEST is easily detected and the malfunctioning hardware identified using this system.

N82-13548/4 PC **A04**/MF **A01**
Swedish Inst. for Materials Testing, Boras. Lab. foer Ytskydd och Korrosion.
Aging and Corrosion Problems with Flat Solar Energy Absorbers. Study Based Upon Literature and Experiment Exchanges Aaldrings-och Korrosions-Problem Hos Plana Termiska Solfaangare. En Studie Baserad Paa Litteratur och Erfarenhetsutbyte.
H. Wennerholm, and K. O. Lagerkvist. 1979, 72p SP-RAPP-1979/4
Text in Swedish.

The construction and the causes of damage to solar energy absorbers are reviewed. Aging is due to ultraviolet radiation, temperature, humidity, oxygen, impurities in the air and other effects. A literature review is given about the constituent parts. The coverplate may be of glass, several types of plastics, fluoro-compounds, fiberglass, or silicones. For the absorbing surface, sintered chromium oxide, black nickel, black iron, copper oxide, manganese oxides, or selective coated alumimium are used. The insulation is often made of mineral wool or polyurethane resins. Inspection data are reported for nine solar flat-shaped energy absorbers. Most of them are used for the production of warm water and have been in use between three months and three years. Nearly all coverplates bore important deposits caused by condensation. Some of the nine aborbers show corrosion on the aborbing surface and/or on insulation.

PB82-137779 PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Research and Development.
The Federal Nonnuclear Energy Research and Development Act (P.L. 93-577) Section 11, Environmental Evaluation. Background Document for National Hearings, October 3-5, 1979, Washington, DC,
Gregory Ondich. Sep 79, 42p EPA-600/9-79-033

Under Section 11 of the Federal Nonnuclear Energy Research and Development Act, the Environmental Protection Agency is responsible for assessing 'the adequacy of attention to energy conservation methods and environmental protection...and the environmental consequences of the application of energy technologies'. The 1973 Section 11 activities examine the Department of Energy management process relating to environmental planning and assessment for energy technology projects. This pre-hearing document summarizes the concerns and questions raised at a series of workshops held in July 1979 as well as EPA's own analysis of how environmental concerns are incorporated into DOE's Management System. The document is intended to provide a focus for further thought and discussion at a National Hearing in October 1979. The substance of the analysis and the discussions are to be used in completing the 1979 Section 11 Report to the President, the Secretary of Energy and Congress.

PB82-139288 PC **A07**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Solar Energy: A History of the RANN Energy Program.
Sep 80, 146p NSF/RA-800536
Contract NSF-C76-21354

This report describes the development of solar energy research under the Research Applied to National Needs (RANN) program of the National Science Foundation (NSF). The information is derived from three primary sources: (1) NSF/RANN planning and administrative documentation, including that provided for congressional hearings, interagency studies, and special program reports; (2) reports on NSF/RANN projects; and (3) proceedings and reports from NSF/RANN workshops and conferences. The report covers the period from the program's inception in 1971 through 1980. Topics discussed include solar schools; solar heating and cooling of buildings; photovoltaic energy conversion; solar thermal energy; wind energy; bioconversion; and ocean thermal energy conversion. NSF awards for the various projects, citing the institution, principal investigator, title, grant number, award amount and duration are provided in the appendices.

PB82-139619 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
The Possible Share of Soft/Decentralized Renewables in Meeting the Future Energy Demands of Developing Regions.
Final rept.,
A. M. Khan. c1981, 44p RR-81-18, ISBN-3-7045-0015-1

An assessment is made of the maximum size of the share of soft/decentralized technologies based on renewable energy sources that could meet the energy demands of the developing world regions, 20 to 50 years from now, if a policy strongly in favor of such renewables were pursued in the coming years. Promising technologies with favorable cost economics and possibilities of large-scale application in urban and rural environments have been identified. The possible role of each such technology in meeting the future energy requirements of the developing regions has been analyzed in the light of the detailed energy demand projections made for different world regions by the Energy Systems Program Group of IIASA. It is concluded that the soft/decentralized technologies based on renewables may be invoked to meet as much as 15% of the commercial final energy demand of the developing regions by 2030.

PB82-139635 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Dynamic Linear Programming Models of Energy, Resource, and Economic-Development Systems.
Final rept.,
Anatoli Propio, and Igor Zimin. c1981, 73p ISBN-3-7045-0010-0, RR-81-14

This report develops a unified dynamic linear programming approach to studying long range development alternatives in the energy sector. With the demand for energy and the supply of nonenergy resources needed to develop the energy supply system given exogenously, the report first seeks the optimal mix, phased over time, of different energy technologies. Next it considers the problem of finding, for primary energy resources, the optimal mix over time of different exploration and extraction technologies. The third part of the report uses an optimization version of a dynamic input-output model to study the macroeconomic impacts of the energy sector. Finally, the report discusses the interactions among these models, presents a general dynamic linear programming framework, and takes up some related methodological issues.

PB82-141037 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Electric Power: Contemporary Issues and the Federal Role in Oversight and Regulation.
Report to the Congress.
21 Dec 81, 75p EMD-82-8

This report is designed to highlight those issues and observations which should be addressed by the Federal Government when making decisions affecting the electric power industry.

PB82-145293 PC **A07**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Energy Saving through Redistribution of the Transport of Goods (Energisparing ved Overfoering av Godstransporter),
Terje Ormhaug, and Thor Svegarden. Dec 80, 145p ISBN-82-7133-336-4
Text in Norwegian.

The possibility for reduction of energy consumption is considered. A redistribution from lorries to railway of a quantity representing approximately 25% of todays tonkilometers on road, might give a yearly reduction of energy consumption equivalent to 48 mill liters diesel oil. The quantity represents about 5% of the fuel consumption in the entire transport field. The 25% represents an expected increase in the interregional transport of goods by lorries and railway towards the turn of this century.

PB82-145582 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Greater Energy Efficiency Can Be Achieved Through Land Use Management.
Report to the Congress.
21 Dec 81, 60p EMD-82-1

This report explores selected concepts, progress, and problems related to energy-efficient land use management.

PB82-153487 PC **A06**/MF **A01**
South Carolina Energy Research Inst., Columbia.
Energy Recovery from Textile Dryer Operations.
Final rept. on Phase 1, Jun 80-Jun 81,
F. J. McCrosson, J. D. Jenkins, and P. W. Yngve.
Aug 81, 122p GRI-80/0078
Contracts GRI-5080-342-0356, DE-AC05-80CS40360

The technical and economic feasibility of implementing a two-step approach for improving use of natural gas in textile dryer operations is presented. The first step involves automatic control of the dryer dampers to minimize the flow of exhaust heat without diminishing dryer performance. The second step involves recovery and use of a portion of the remaining exhaust heat. These two steps have the potential for reducing natural gas consumption in the dryers by 45 to 65 percent. Exhaust flow rates are minimized by increasing dryer humidity to the maximum practical limit. This maximum humidity, which is about 0.1 lb water/lb dry air, is maintained by automated adjustments of the damper. Three commercially available devices for measuring the stack humidity and controlling the dampers are discussed and a program for further evaluation presented. Several approaches for recovering some of the residual exhaust energy after the dampers have been adjusted are evaluated. Based on these evaluations, three commercially available air-to-air heat exchangers are identified as being particularly suitable for using the sensible exhaust heat to pre-heat dryer make-up air. A program to further evaluate these air-to-air heat exchangers at operating textile mills is presented.

PB82-157553 PC **A03**/MF **A01**
Universidad Nacional Autonoma de Mexico, Mexico City. Inst. de Ingenieria.
Solar Concentrators,
Rafael Almanza, Alberto Valdes, and Serafin Lopez. Jun 81, 40p
Trans. of mono. Concentradores Solares, Mexico City, 48p Jun 81.

A very important subject in some solar energy applications is the development of solar concentrators since these devices make it possible to obtain temperatures in the range of 100 to 3,600 degrees C. This paper presents different types of geometries used in concentrators. Some comments are made on the theoretical and experimental analysis necessary to evaluate the geometries and on the type of laboratory equipment needed to obtain experimental data. At the end of the report, a description of how to build parabolic trough mirrors is made. The experience gained by the authors, who have been working on this subject for the past five years, is summarized, showing some of the problems related with such concentrators.

PB82-861006 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cogeneration: Economic Analysis. 1976-January, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Jan 82.
Jan 82, 176p
Supersedes PB81-856460.Prepared in cooperation with the Department of Energy, Washington, DC.

Citations in this bibliography cover economic analyses of techniques and technology for cogeneration and the effects of government policies and industrial attitudes toward cogeneration. Combined energy systems and combined manufacturing energy systems which utilize waste heat and waste products are considered, as well as those which use traditional fuels. Considerable attention is given to the feasibility of cogeneration. (This updated bibliography contains 149 citations, 78 of which are new entries to the previous edition.)

PNL-3195-WERA-4 PC **A11**/MF **A01**
Geomet, Inc., Gaithersburg, MD.
Wind Energy Resource Atlas. Volume 4. The Northeast Region.
K. E. Pickering, J. M. Vilardo, J. T. Schakenbach, D. L. Elliott, and W. R. Barchet. Sep 80, 230p
Contract AC06-76RL01830

This atlas of the wind energy resource is composed of introductory and background information, a regional summary of the wind resource, and assessments of the wind resource in each state of the region. Background is presented on how the wind resource is assessed and on how the results of the assessment should be interpreted. A description of the wind resource on a regional scale is then given. The results of the wind energy assessments for each state are assembled in this chapter into an overview and summary of the various features of the regional wind energy resource. An introduction and outline are provided for in the descriptions of the wind resource given for each state. Assessments for individual states are presented. The state wind energy resources are described in greater detail than is the regional wind energy resource, and features of selected stations are discussed. This preface outlines the use and interpretation of the information found in the state chapters. (ERA citation 06:004735)

RLO-2438-77/2 PC **A11**/MF **A01**
Environmental Technology Assessment, Inc., Oak Brook, IL.
Wind Characteristics over Complex Terrain: Laboratory Simulation and Field Measurements at Rakaia Gorge, New Zealand.
R. N. Meroney, A. J. Bowen, D. Lindley, and J. R. Pearse. May 78, 243p
Contract EY-77-S-06-2438

A survey program is described which utilizes laboratory simulation of the relevant wind characteristics in a meteorological wind tunnel. To evaluate the validity of laboratory simultation methods and provide a confidence measurement bound for laboratory data, a limited field measurement program was simultaneously conducted. In this study both terraced and contoured models of the Rakaia River Gorge region were prepared to an undistorted geometric scale of 1:5000. The contoured model was examined for three separate surface roughness conditions: a surface textured to represent typical paddock grass roughness only, the same surface with zero-porosity shelterbelts added, and the same surface with porous shelterbelts added. (ERA citation 05:013488)

RLO-2439-78/3 PC **A07**/MF **A01**
Georgia Inst. of Tech., Atlanta.
Energy Statistics for Large Wind Turbine Arrays. Annual Progress Report, May 1, 1977-April 30, 1978.
C. G. Justus, and A. S. Mikhail. May 78, 127p
Contract EY-76-S-06-2439

Wind energy statistics of large arrays of wind energy conversion systems (WECS) have been studied in four regions of the country: the New England and Central United States regions (Justus, 1976) and the Great Lakes and Pacific Coast regions (Justus and Hargraves, 1977a). Results obtained from multiregional arrays of selected sites from these four previously studied regions are presented. The purpose of these multiregional analyses has been to investigate the upper limits of wind diversity benefit by studying large spatial areas to aid in determining if power might be produced by WECS in areas of high wind potential and transmitted over long distances to areas of high demand, and to use data from all four of the individual regions in developing and refining a generic methodology with which array statistical properties may be simulated adequately with simple averages or single-site input information. (ERA citation 05:018807)

SAN-1468-1(App.) PC **A08**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Solar Central Receiver Prototype Heliostat: Phase 1. Appendices to Final Technical Report, September 30, 1977-June 24, 1978.
Oct 78, 164p
Contract EG-77-C-03-1468

The appendices include (A) design compliance with DOE 001 specification, (B) General Electric heliostat parts list and drawings, (C) specular solar transmittance and reflectance measurements, (D) preliminary draft-design specification for conceptual design of automatic foundation machine, (E) Ingersoll-Rand critique of GE automatic foundation machine concept, and (F) appendix to section 4.0 - controls and drives. (ERA citation 05:013328)

SAN-1745-1(V.2) PC **A11**/MF **A01**
Solaramics, El Segundo, CA.
Solar Central Receiver Prototype Heliostat: Phase I. Volume II. Cost, Trade-off, Appendix. Final Technical Report.
Sep 78, 247p
Contract ET-78-C-03-1745

The objective of this study and analysis was to optimize the structural design and performance of the heliostat so that satisfactory performance would be achieved over a system life of 30 years at minimum cost. Briefly, the design constraints can be broken into

two categories; those of a transient nature and those of a steady-state nature. Transients include wind loading, local ambient vibrations, earthquakes, rain and hail loading, and temperature changes. The steady-state parameters include gravity, ice loading, and long-term weathering effects. For this study the reflective component of the SOLARAMICS heliostat consists of a foamed waste glass panel to which a thin glass reflector will be permanently bonded. Ten 4 ft x 10 ft panels and one 10 ft x 2 ft panel arrayed for 420 ft exp 2 of reflecting surface are proposed in this design. The total heliostat array and controls are mounted on a vertical implanted hollow column (pedestal) made of a rigid ceramic material. This volume presents cost estimates, the preliminary test plan, scope and schedule estimates, trade-off studies, and design drawings, sketches, and schematics. (ERA citation 05:008297)

SAND-80-0808 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Protective Coatings and Sealants for Solar Applications.
K. B. Wischmann, and M. H. Gonzales. Sep 80, 46p
Contract AC04-76DP00789

An aging study has been completed which evaluated a number of polymeric materials for potential use as (1) protective coatings for back surfaces of mirrors and (2) solar heliostat edge seals. These investigations were conducted in an artificial weathering chamber that accelerated thermal cycling. The primary mirror failure mode was observed to be silver corrosion resulting from moisture exposure. To increase mirror longevity in current heliostat designs, intimate bonding at all the composite interfaces is essential to minimize moisture pathways to the silvered surface. If any voids or delaminations are present, mirror degradation will eventually occur. Delaminations can also occur as the result of mechanical stresses brought about by mismatches in the various materials coefficients of thermal expansion. If good bonding cannot be achieved or mechanical stresses avoided, then improved moisture barriers must be designed to assure mirror longevity. With good adhesion, a KRATON rubber was found to exhibit superior back surface mirror protection (12 months in environmental chamber with no corrosion). An ultraviolet stabilized butyl rubber appeared to be the best edge seal. All heliostats edge sealed with silicones showed silver corrosion which indicated either poor bonding or moisture permeation. (ERA citation 05:037905)

SAND-80-1637 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Sum-of-Gaussians Representation of Sunshape.
C. N. Vittitoe, and F. Biggs. Sep 80, 46p
Contract AC04-76DP00789

The angular distribution of sunlight reaching the earth varies considerably because of interaction with the atmosphere. Five typical sunshapes, chosen from the widest to the narrowest shape in the Lawrence Berkeley Laboratory data, are approximated by a sum of six Gaussian distributions. In many applications sunshapes are convolved with error-cone distributions that represent a statistical description of uncertainties encountered in an optical concentrating system. Sunshape convolution with a series of circular-normal error cones indicates that the effective sunshape is well represented by analytic convolution between the error cone and the sum of Gaussians. This analytic convolution can replace the more costly (in time and computer storage) numerical methods for convolving the error cone and the experimental sunshape distribution. Results of both calculation methods are found to be consistent when the dispersion of the error cone is greater than 0.0012. A simple prescription indicates how each of the analytic representations may be transformed to approximate sunshapes appropriate for slightly different atmospheric conditions. The analytic form of the effective sunshape is given as a sum of six elliptic-normal distributions when the error cone is an elliptic-normal distribution. (ERA citation 05:037813)

SAND-80-1774 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
Commuting Practices and Attitudes at Sandia National Laboratories in 1980.
D. C. Stone, L. V. Rigby, R. S. McClaflin, and B. J. Champion. Sep 80, 77p
Contract AC04-76DP00789

This report presents the results of a commuting survey administered by mail to a random sample of Sandia National Laboratories, Albuquerque employees in March 1980. The results are based on 1,088 usable returns sorted by nine basic criteria including area of residence, distance from work site, and general occupation classification. The text describes the current status of commuting practices, fuel usage, potential for increased ridesharing, and employee attitudes. Appendices provide the original questionnaire, tables of detailed results, and summary of write-in comments. (ERA citation 05:038251)

SAND-80-7002 PC **A02**/MF **A01**
Kearney (A.T.), Inc., Los Angeles, CA.
Shenandoah Solar Collector.
Sep 80, 22p
Contract AC04-76DP00789

The study was designed to meet the following objectives: 1) develop a cost estimate for manufacturing 124 Seven-Meter Parabolic Dish Solar Collectors to be installed at Shenandoah, Georgia; 2) make recommendations to lower the expenses of collector fabrications and overall project cost; 3) identify alternate sources for materials and sub-contracted services; and 4) provide detailed backup data to support all estimates. Results are presented. (ERA citation 06:004698)

SAND-80-7003 PC **A05**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Material and Process Screening as Applied to a Reinforced Plastic Parabolic Trough Concentrator Module.
R. Hodge. Aug 80, 77p
Contract AC04-76DP00789

Existing parabolic trough solar collectors are basically sheet metal designs utilizing aluminum or steel as the major structural materials. The relatively high labor content associated with these sheet metal designs has generated an interest in investigating the cost effectiveness of using reinforced plastics as a major structural material for trough solar collectors. This interest is bolstered by a growing desire on the part of industry to identify new material-process combinations which save weight, use less energy, and require less capital equipment and assembly costs. The use of reinforced plastics as the basic material for a line-focus parabolic trough concentrator module is studied. This module constitutes a basic building block with which longer trough rows can be built. The basic part analysis is described including the quantification of key material and part-function relationships. In addition candidate materials and processes are reviewed and, the costs associated with the most attractive combinations defined. Finally, the major conclusions and recommendations are summarized. (ERA citation 05:037906)

SAND-80-8032 PC **A04**/MF **A01**
Sandia National Labs., Livermore, CA.
Status and Recommended Future of Plastic-Enclosed Heliostat Development.
C. L. Mavis. Oct 80, 56p
Contract AC04-76DP00789

Tests have shown that biaxially oriented Kynar film has excellent weathering properties as an enclosure material and is practical to manufacture commercially. Reflectors using Kynar or weatherized polyester also appear to be feasible. The projected low cost of properly designed plastic-enclosed heliostats indicates that further development effort should be continued. Both Boeing's one-piece enclosure and General Electric's multi-piece enclosure concept should be pursued. Full-size enclosures and reflectors need to be fabricated and set up at several desert locations to verify the designs and obtain weathering data under actual use conditions. (ERA citation 05:037907)

SAND-80-8175 PC **A08**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Internally Insulated Thermal Storage System Development Program. Final Report.
Dec 79, 172p MCR-79-1369
Contract EY-76-C-04-0789

The primary objective of this program is to define a cost effective thermal storage system for a solar central receiver power system using molten salt stored in internally insulated carbon steel tanks. This effort was divided into five tasks. The scope of these tasks were: (1) Task 1, internal insulation materials test program: screening tests of candidate insulation materials were conducted by exposing them in 866 exp 0 K (1100 exp 0 F) molten salt for 500 hours. Materials selected from these tests were exposed to 866 exp 0 K salt for up to 5000 hours; (2) Task 2, internally insulated thermocline storage tank analysis: a computer thermal model of internally insulated thermocline tanks was developed to predict thermocline behavior under various operational strategies; (3) Task 3, storage tank design: a preliminary design study and optimization was made of both an externally insulated carbon steel tank for 561 exp 0 K (550 exp 0 F) molten salt and an internally/externally insulated carbon steel tank for 839 exp 0 K (1050 exp 0 F) molten salt; (4) Task 4, storage system parametric analyses: a computer cost optimization was performed to find the optimum configuration for each of three different storage concepts - thermocline, dual-tank, and cascade systems. The analyses were done as a function of storage size and considered the following factors: tank geometry; number of tanks; insulation type, thickness, and cost; storage use rate; heat loss rate and its impact on upstream costs (heliostats, etc.); and others; (5) Task 5, storage subsystem research experiment (SRE): based on the conclusions of Tasks 1 through 4, a subsystem research experiment was proposed that would demonstrate both fabrication and performance of the major components of the recommended storage design. Results are detailed. (ERA citation 05:020459)

SAND-80-8235 PC **A03**/MF **A01**
Sandia National Labs., Livermore, CA.
1980 Solar Central Receiver Technology Evaluation.
K. W. Battleson, P. D. Laquil, III, J. D. Fish, H. F. Norris, Jr., and J. J. Iannucci. Oct 80, 47p
Contract AC04-76DP00789

A task force of Sandia National Laboratories Livermore personnel has reviewed and evaluated the status of solar central receiver technology as of early 1980. The methodology and results of the evaluation are described. The evaluation concentrated on the detailed component and system designs developed by industrial firms; the conclusions are based on these designs. The task force makes recommendations for the allocation of DOE R and D resources within the solar central receiver program. Results of the evaluation are also intended to point out to developers of central receiver technology where improvements are necessary. The recommendations emphasize the need for a continuing effort on the nitrate salt technology for large scale electricity generation. This technology appears to be capable of producing energy over a wide range of capacity factors at lower cost than with other heat transport fluids. A brief discussion of central receiver technology applied to industrial process heat is presented. (ERA citation 06:000496)

SERI/PR-8802-9-T2 PC **A03**/MF **A01**
Colorado State Univ., Fort Collins.
Novel Concepts in Electrochemical Solar Cells. Second Quarterly Progress Report, August 15, 1979-October 15, 1979.
J. DuBow, R. Job, R. Krishnan, and B. Gale. 1979, 36p
Contract AC02-77CH00178

It is considered that the short term stability of n-GaAs PEC's in a ferrocene-based, ambient temperature molten salt electrolyte is reasonably good. However, longer term evaluation is required to determine the extent and significance of corrosion, stability, etc. Extremely few fundamental studies have been made of the semiconductor/molten salt interphase and experiments in this area would be most useful. Indeed, even the design parameters for PECs of any kind have not been quantitatively delineated and present consideration will be given to models for PEC solar cells and limitations caused by ion transport in the electrolyte. The MoSe sub 2 and MoS sub 2 electrodes appear to have substrate reproducibility and transport limitations that make them unsuitable candidates for efficient PEC's at this time. Similarly, the lack of availability of high quality CuInSe sub 2 and CuInS sub 2 substrates limits the quantitative experimental evaluation of their utility for PEC applications. We are presently focusing attention on CdSe/CdTe mixtures and CdS as electrodes as well as Si and GaAs in molten salt and polyelectrolyte solutions. The system for solar cell evaluation and network analysis of substrates and cells was mode operational. Preliminary work on economic and theoretical modelling was begun. Progress is reported. (ERA citation 05:031860)

SERI/PR-8802-9-T3 PC **A03**/MF **A01**
Colorado State Univ., Fort Collins.

Novel Concepts in Electrochemical Solar Cells. Third Quarterly Progress Report, November 15, 1979-January 15, 1980.
J. DuBow, R. Job, and R. Krishnan. 1980, 32p
Contract AC02-77CH00178

Efforts have been primarily directed toward evaluation of the room temperature molten salt electrolyte in terms of its overall performance for photovoltaic cells. Mass transport processes may prove to be the rate-limiting factor for such electrolytes, unless the concentration of the photo-active redox component can be increased and the solvent viscosity reduced. Acid-base surface chemistry of n-GaAs as occurs in aqueous systems, has been found present and its consequences will be further explored. The selection and optimization of PEC electrolytes is a complex task and we believe that a systems approach would facilitate in identifying the basic electrolyte properties needed. A preliminary analysis reveals that although some of the criteria for an electrolyte are definable precisely, others do require empirical experimentation. It can be concluded that relatively few electrolytes in current use are adequate and it would appear that greater efforts to develop electrolytes would be advantageous. The various types of electrolytes that could be used for PEC's have been identified. Good quality MoSe sub 2 single crystals can be grown and short circuit currents greater than previously reported have been achieved in an I sub 2 /I exp - /Pt cell. A novel technique to produce photo-active films by anodization is being investigated, initially for the formation of polycrystalline MoSe sub 2 layers. (ERA citation 05:031861)

SERI/PR-8802-9-T4 PC **A02**/MF **A01**
Colorado State Univ., Fort Collins.
Fourth Quarterly Progress Report, January 15, 1980-May 15, 1980.
1980, 5p
Contract AC02-77CH00178

Research on surface charge and specific ion adsorption/acid-base effects at the n-GaAs/room temperature molten salt interphase and further evaluation of potential redox systems for photoelectrochemical cells is briefly described. (ERA citation 05:031862)

SERI/SP-98156-1 PC **A09**/MF **A01**
Los Angeles Mayor's Office, CA.
Solar Envelope Zoning: Application to the City Planning Process. Los Angeles Case Study.
Jun 80, 192p
Contract AC02-77CH00178

Solar envelope zoning represents a promising approach to solar access protection. A solar envelope defines the volume within which a building will not shade adjacent lots or buildings. Other solar access protection techniques, such as privately negotiated easements, continue to be tested and implemented but none offer the degree of comprehensiveness evident in this approach. Here, the City of Los Angeles, through the Mayor's Energy Office, the City Planning Department, and the City Attorney's Office, examine the feasibility of translating the concept of solar envelopes into zoning techniques. They concluded that envelope zoning is a fair and consistent method of guaranteeing solar access, but problems of complexity and uncertainty may limit its usefulness. Envelope zoning may be inappropriate for the development of high density centers and for more restrictive community plans. Aids or tools to administer envelope zoning need to be developed. Finally, some combination of approaches, including publicly recorded easements, subdivision approval and envelope zoning, need to be adopted to encourage solar use in cities. (ERA citation 05:033391)

SERI/TP-333-500 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Implementation of Solar Industrial Process Heat: Summary.
D. W. Kearney. Nov 79, 4p
Contract EG-77-C-01-4042

The implementation of solar industrial process heat systems will depend not only on the successful development of reliable and efficient solar technologies, but also on the intelligent and sound application of process engineering principles. This poses an important challenge which must be given increasing attention if SIPH systems are to be adopted by industry. (ERA citation 05:008357)

SERI/TP-334-478 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Summary of Solar Experience with the Soiling of Optical Surfaces.
P. J. Call. Feb 80, 15p
Contract EG-77-C-01-4042

The results of a workshop held on July 16-17, 1979 to discuss available experimental data, current and planned experimental investigations, directly applicable optical principles, and relevant theory are summarized. The summary is in terms of the magnitude of effects on various types of systems and the effects of location, surface properties, and natural/artificial removal. The economics of prevention, tolerance, and removal are also summarized. (ERA citation 05:023959)

SERI/TR-352-504 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Potential Displacement of Petroleum Imports by Solar Energy Technologies.
P. DeLeon, B. L. Jackson, R. F. McNown, and G. J. Mahrenholz. May 80, 69p
Contract AC02-77CH00178

The United States currently imports close to half of its petroleum requirements. This report delineates the economic, social, and political costs of such a foreign oil dependency. These costs are often intangible, but combined they clearly constitute a greater price for imported petroleum than the strictly economic cost. If we can assume that imported oil imposes significant socioeconomic costs upon the American economy and society, one way to reduce these costs is to develop alternative, domestic energy sources - such as solar energy technologies - which can displace foreign petroleum. The second half of this report estimates that by the year 2000, solar energy technologies can displace 3.6 quads of petroleum. This figure includes solar energy applications in utilities, industrial and agricultural process heat, and transportation. The estimate can be treated as a lower bound; if the United States were to achieve the proposed goal of 20 quads by 2000, the amount of displaced oil probably would be greater. Although all the displaced oil would not be imported, the reduction in imported petroleum would relieve many of the conditions that increase the present cost of foreign oil to the American consumer. (ERA citation 05:029209)

SERI/TR-434-191 PC **A05**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Municipal Bond Financing of Solar Energy Facilities.
S. S. White. Dec 79, 83p
Contract EG-77-C-01-4042

The application of the laws of municipal bond financing to solar facilities is examined. The type of facilities under consideration are outlined. The general legal principles of municipal securities financing are discussed. The effect of recent decisions applying antitrust liability to municipal corporations is also discussed. Five specific types of municipal bonds are explained. The application of Section 103 of the Internal Revenue Code of 1954, as amended, to the issuance of municipal bonds for solar facility financing is examined also. Five bond laws of five representative states are examined and whether the eight types of solar facilities under consideration could be financed under such law is discussed. The application of the general legal principle is illustrated. Three hypothetical situations are set forth and common legal issues to be confronted by city officials in proposing such financing are discussed. These issues will be raised in most financings, but the purpose is to examine the common context in which they are raised. It is concluded that if it can be shown that the purpose of the solar facilities to be financed is to benefit the public, all legal obstacles to the use of municipal financing of solar facilities can be substantially overcome. (ERA citation 05:013238)

SERI/TR-8052-1 PC **A15**/MF **A01**
General Motors Corp., Warren, MI.
Heliostat Production Evaluation and Cost Analysis.
J. F. Britt, C. W. Shulte, and H. L. Davey. Dec 79, 350p
Contract EG-77-C-01-4042

The primary objective of this study is to provide a factory cost for the production of heliostats in terms of 1979 dollars. Factory cost is defined as the sum of all direct labor, direct material and burden expenses that are incurred in the manufacture of a heliostat, and its packaging for shipment. Transportation, installation, taxes other than plant real taxes, profit, selling expenses, and all other profit and loss items are not included. Two production volumes are considered, 25,000 heliostat units per year and 250,000 heliostat units per year. The study concluded that the factory cost to manufacture heliostats is $95.99/m exp 2 at 25,000 units per year and $67.95/m exp 2 at 250,000 units per year. The Policy Analysis Branch of the Solar Energy Research Institute estimates that this implies an installed price of $122.12/m exp 2 at the 25,000 unit-per-year volume. (ERA citation 05:023962)

SOLAR/0010-80/06 PC **A12**/MF **A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
Environmental Data for Sites in the National Solar Data Network.
Jun 80, 271p
Contract AC01-79CS30027

Available meteorological data are tabulated for reporting sites in the National Solar Data Network as follows: insolation, temperature, wind, and relative humidity. (ERA citation 05:031779)

TID-28706 PC **A06**/MF **A01**
Centec Consultants, Inc., Fort Lauderdale, FL.
Coating Industry: Energy Savings with Volatile Organic Compound Emission Control.
1979, 113p
Contract W-31-109-ENG-38

This Technology Applications Manual presents technical and economic data to enable engineers and managers in the coating industry to evaluate the energy-conservation opportunities for installation of solvent emission-control systems. Although the properties of the solvents vary considerably, the information contained in the report serves to improve the ability of the engineer to make quick estimations of energy savings, energy rates, economics, and performance of control systems and heat-recovery options. The emphasis is directed to a discussion of add-on devices, such as thermal and catalytic incineration. New technologies, such as the one recently demonstrated by the Department of Energy in cooperation with industry and the National Coil Coaters Association, are highlighted. Extensive graphics and illustrations show energy use, savings, and economics; these are supplemented by calculations to be used by each plant to determine site-specific data. (ERA citation 05:004699)

UCID-18764 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Open-Loop Heliostat Reflector.
G. T. Koide. 30 Jul 80, 29p
Contract W-7405-ENG-48

A microcomputer controlled heliostat driven in an elevation/azimuth gimbal arrangement with simple shaft encoders can reflect a sunlight beam to within +-two inches vertically and +-one inch horizontally at a distance of seven feet from the target, which corresponds to an arc of +-1.5 exp 0 . To minimize the error in tracking, the reflector should be aligned as accurately as possible with the north-south axis, with a transit or solar noon. (ERA citation 05:033522)

UCRL-52508-79 PC **A10**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Demonstration of the Capabilities of the LLL Energy Policy Model: 1979 Update.
C. J. Anderson, R. N. Castleton, B. L. Coles, and J. T. Rambo. 23 Aug 79, 223p
Contract W-7405-ENG-48

LLL's Energy Policy Model (EPM) has evolved substantially since July 1978, when the first demonstration report was issued. In this report, the update base case and three sensitivity cases are discussed: a nuclear phase-out scenario, motivated by the incident at TMI; a scenario where oil import are reduced dramatically reflecting a possible government policy; and a scenario with a limitation on coal production that could result from environmental concerns. Other recent work summarized includes some preliminary results of an historical comparison project, which validates, to some extent, the EPM. Some issues regarding convergence of the model are examined and some implications for regional analyses using the model are discussed. (ERA citation 05:015865)

10B. Power Sources

DOE/ET/15529-T1 PC **A05**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Energy Systems Div.
MHD Electrode Development. Quarterly Report, April-June 30, 1980.
J. W. Sadler, D. L. Dietrick, and E. W. Frantti. Aug 80, 95p
Contract AC01-79ET15529

Emphasis within this program is now being directed towards the engineering development of cold metallic electrodes, and in particular the identification and evaluation of alternatives to platinum for use as anodes. A literature search, concentrating on hot corrosion resistant alloys, has been undertaken and results are presented. In addition, results of platinum-copper diffusion studies and a preliminary evaluation of sputter coated specimens of TiB sub 2 clad copper are reported. Laboratory anode arc erosion studies have continued. A number of modifications incorporated in the test setup are described. This modified test arrangement has been used to obtain comparative data on a number of potential anode metal alloys. Further work is required to refine the test, particularly to provide a reliable method of applying corrodent to the specimens under test. No significant laboratory electrochemical corrosion tests were completed during this reporting period. Facility test operations were suspended upon completion of WESTF Test 49 during the prior quarter to permit basic facility modifications in support of the addition of a 3 Tesla magnet. The status of design, procurement and modification activities is presented. (ERA citation 06:000902)

DOE/ET/23046-3 PC **A03**/MF **A01**
EIC Corp., Newton, MA.
Electrodeposition of Polycrystalline and Amorphous Silicon for Photovoltaic Applications. Quarterly Technical Progress Report No. 03, December 1, 1979-February 29, 1980.
R. D. Rauh, T. L. Rose, R. A. Boudreau, T. O. Hoover, and D. L. Natwig. Jul 80, 36p
Contract AC03-79ET23046

The survey of Si precursors leading to electrodeposition of Si in organic solvents was extended this quarter to cover SiCl sub 4 , (ClC sub 3 H sub 6)SiCl sub 3 , and Si(OEt) sub 4 . Plating experiments with SiHCL sub 3 solutions in propylene carbonate with 0.1M tetrabutylammonium tetrafluoroborate were continued. Silicon was deposited on ITO glass (Nesatron) as well as Mo substrates at temperatures from 25-80 exp 0 C. Both potentiostatic and galvanostatic conditions were used. The high resistance of the films (10 exp 6 -10 exp 8 omega -cm) limited the thickness which could be deposited by either method to less than 5 mu m. X-ray analysis of the films confirmed that they were amorphous. SEM analysis of the films revealed a very porous structure with nodules about 1 mu m in diameter. Annealing the deposit at 400 exp 0 C in an Ar:H sub 2 atmosphere resulted in a slightly smoother surface but the nodules remained. The films deposited on ITO glass had a band gap of about 1.0 eV and an EO sub 4 value of 1.5-2.0 eV. The Auger analysis of the films showed the presence of large amounts of oxygen in the samples that had been exposed to air. The first silicon deposits were obtained from the high temperature fluoride molten salts. Plating on a platinum cathode resulted in silicide formation which suggests a method of making a PtSi alloy for use as a stable reference electrode in the fluoride melts containing silicon (IV). Galvanostatic deposition on silver substrates in general gave thick, uneven, and poorly adherent deposits. (ERA citation 05:037818)

DOE/ET/23108-6 PC **A02**/MF **A01**
RCA Labs., Princeton, NJ.
Photovoltaic Mechanisms in Polycrystalline Thin-Film Silicon Solar Cells. Quarterly Report No. 5, August 1-October 31, 1980.
D. Redfield. Nov 80, 22p
Contract AC01-79ET23108

Knowledge of the electronic behavior of grain boundaries in polycrystalline silicon has advanced significantly as a consequence of new measurements of the effects of annealing on the electrical characteristics of grain boundaries. Most polycrystalline Si is found to have negligible potential barriers at the boundaries before heating, and substantial barriers after heating. On the basis of a very new model of Schottky-barrier formation, these results lead to the interpretation that most boundaries are very clean before heating and that the barriers arise when impurities diffuse to the boundaries and induce lattice defects in the adjacent Si. Oxygen is the most likely impurity to be responsible, but only on circumstantial evidence. The relation to existing models and the remaining questions point the way to further understanding. (ERA citation 06:008747)

DOE/GFETC/10059-2 PC **A07**/MF **A01**
Virginia Corp. of Richmond.
Economic Evaluation of Losses to Electric Power Utilities Caused by Ash Fouling. Final Technical Report, November 1, 1979-April 30, 1980.
F. R. Burkhardt, and M. M. Persnger. 1980, 145p
Contract AC18-79FC10059

Problems with convection ash fouling and wall slagging were considerable during our study. The Dakota lignites posed the greatest problems, particularly with fouling. The subbituminous coals had considerable problems, related mostly with wall slagging. The Texas lignites had few problems, and those were only associated with wall slagging. The generation losses were as follows: The Dakota lignite burning stations averaged an overall availability of 87.13%. Convection fouling outages were responsible for 57.75% of this outage time for a decrease in availability of 7.43%. Fouling was responsible for curtailment losses of 317,649 Mwh or 8.25% of the remaining available generation. Slagging was responsible for losses of 2732 megawatt hours or .07% of the remaining available generation. Total ash related losses amounted to 16.08% of the total available generation. The subbituminous burning stations averaged an overall availability of 78.36%. Total ash related losses amounted to 1.54% of the total available generation. The Texas lignite burning stations averaged an overall availability of 80.63%. No ash related outage losses occurred. Slagging curtailments accounted 0.08% of the total available generation. Costs due to ash fouling and slagging related curtailments are a tremendous sum. Seven power stations were studied for a six month period to assess costs. The total cost directly attributable to ash slagging and fouling condition was $20,638,113. Recommendations for reducing the problems involve soot blowers, control of furnace gas exit temperature, water blowers and more conservative boiler design. (ERA citation 06:016793)

DOE/JPL/955089-80/4 PC **A07**/MF **A01**
Optical Coating Lab., Inc., City of Industry, CA. Photoelectronics Div.
Silicon Solar Cell Process Development, Fabrication and Analysis. Phase II. Annual Report, 1 July 1979-30 June 1980.
H. I. Yoo, P. A. Iles, F. F. Ho, and D. C. Leung. 1980, 140p
Contract NAS-7-100-955089

Solar cells were fabricated from EFG (RH) ribbons from multiple dies, silicon on ceramic (SOC), dendritic web, cast silicon by HEM, and semi-continuous CZ from both VARIAN and HAMCO. Baseline and improved solar cells were made from the sheets. Baseline solar cells processed in both Phase I and Phase II, involving cells from EFG, SOC, dendritic web, and HEM, indicated that no significant improvement in silicon sheet quality has been achieved in Phase II. Solar cells from semi-continuous CZ showed cell performance close to the conventional CZ control cells, although the cells from the semi-continuous CZ have shown wider performance range because of variation in crystalline perfection. Generally, process upgrading provided improvement in cell performance, the improvement depending on the process used and the quality of the sheet silicon. Study of the effect of grain size on solar cell performance suggested that the minimum grain size to make solar cells of 10% AMO efficiency is about 500 mu m, which is expected to provide minimum module efficiency of 10% AMI. If other harmful impurities are added in the process of sheet growth, the minimum grain size must be increased. The BSF study showed that the higher the resistivity of the starting substrates, the greater the relative improvement in cell performance, probably because of greater shift in Fermi levels at the back L/H junction (pp+) and also because of the higher initial values of minority carrier diffusion length. This study also suggested that proper control of the back-surface field (BSF) process could minimize the junction shunting problems often introduced by the BSF processing. (ERA citation 06:007146)

DOE/SF/10505-4 PC **A03**/MF **A01**
Water and Power Resources Service, Denver, CO. Engineering and Research Center.
Solar/Hydro Integration Study. Technical Progress Report, February-July 1980.
1980, 47p
Contract AI03-79SF10505

The Water and Power Resources Service in cooperation with the Department of Energy (DOE) is investigating the technical and economic feasibility of integrating solar central receiver powerplants with the Federal hydroelectric power system in the southwest United States. The principal hydro facility in this region is Hoover Dam. It is located on the Colorado River with Lake Mead on the upstream side and Lake Mohave on the downstream side. The central receiver was selected for this application because DOE has identified it as the most economically feasible design for large power systems, i.e., 100-MWe systems or larger. Typical meteorological year (TMY) data were obtained for Las Vegas from the Solar Energy Research Institute. Plots of available solar energy at Yuma and Mormon Mesa are presented for several operational threshold levels. The data show that a solar plant's operational time can be reduced by 20% and still utilize more than 97% of the available solar energy. The Mormon Mesa site has slightly more solar energy available than the Yuma site. A meteorological surface observation network (MESONET) weather station is being prepared for installation at the Yuma site. The MESONET station which normally measures temperature, relative humidity, barometric pressure, wind speed, and wind direction will be retrofitted to measure direct beam and global radiation. The radiation data will be used in dynamic simulations of solar power systems. (ERA citation 06:005926)

N82-13386/9 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Experimental and Analytical Investigation of a Fluidic Power Generator.
V. Sarohia, L. Bernal, and R. B. Beauchamp. 15 Nov 81, 81p JPL-PUB-81-100
Contract NAS7-100

A combined experimental and analytical investigation was performed to understand the various fluid processes associated with the conversion of flow energy into electric power in a fluidic generator. Experiments were performed under flight-simulated laboratory conditions and results were compared with those obtained in the free-flight conditions. It is concluded that the mean mass flow critically controlled the output of the fluidic generator. Cross-correlation of the outputs of transducer data indicate the presence of a standing wave in the tube; the mechanism of oscillation is an acoustic resonance tube phenomenon. A linearized model was constructed coupling the flow behavior of the jet, the jet-layer, the tube, the cavity, and the holes of the fluidic generator. The analytical results also show that the mode of the fluidic power generator is an acoustical resonance phenomenon with the frequency of operation given by f approx = a/4L, where f is the frequency of jet swallowing, a is the average speed of sound in the tube, and L is the length of the tube. Analytical results further indicated that oscillations in the fluidic generator are always damped and consequently there is a forcing of the system in operation.

N82-13490/9 PC **A03**/MF **A01**
Engelhard Minerals and Chemicals Corp., Edison, NJ. Engelhard Industries Div.
Develop and Test Fuel Cell Powered on-Site Integrated Total Energy System. Phase 3: Full-Scale Power Plant Development.
Quarterly Report, Feb. - Apr. 1981.
A. Kaufman. 24 Jun 81, 50p NASA-CR-165328, DOE/NASA/0241-1
Contract DEN3-241

An integrated 5 kW power system based upon methanol fuel and a phosphoric acid fuel cell operating at about 473 K is described. Description includes test results of advanced fuel cell catalysts, a semiautomatic acid replenishment system and a completed 5 kW methanol/system reformer. The results of a preliminary system test on a reformer/stack/inverter combination are reported. An initial design for a 25 kW stack is presented. Experimental plans are outlined for data acquisition necessary for design of a 50 kW methanol/steam reformer. Activities related to complete mathematical modelling of the integrated power system, including wasteheat utilization, are described.

N82-13491/7 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Space Applicable DOE Photovoltaic Technology: An Update.
J. Scott-monck, P. Stella, and P. Berman. 15 Nov 81, 25p NASA-CR-165021, JPL-PUB-81-91
Contract NAS7-100

Photovoltaic development projects applicable to space power are identified. When appropriate, the type of NASA support that would be necessary to implement these technologies for space use is indicated. It is conducted that the relatively small market and divergent operational requirements for space power are mainly responsible for the limited transfer of terrestrial technology to space applications. Information on the factors which control the cost and type of technology is provided. Terrestrial modules using semiconductor materials are investigated.

N82-13492/5 PC **A08**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Distributed Photovoltaic Systems: Utility Interface Issues and Their Present Status.
M. Hassan, and J. Klein. 15 Sep 81, 166p NASA-CR-165019, JPL-PUB-81-89
Contracts NAS7-100, DE-AI01-76ET-20356

Major technical issues involving the integration of distributed photovoltaics (PV) into electric utility systems are defined and their impacts are described quantitatively. An extensive literature search, interviews, and analysis yielded information about the work in progress and highlighted problem areas in which additional work and research are needed. The findings from the literature search were used to determine whether satisfactory solutions to the problems exist or whether satisfactory approaches to a solution are underway. It was discovered that very few standards, specifications, or guidelines currently exist that will aid industry in integrating PV into the utility system. Specific areas of concern identified are: (1) protection, (2) stability, (3) system unbalance, (4) voltage regulation and reactive power requirements, (5) harmonics, (6) utility operations, (7) safety, (8) metering, and (9) distribution system planning and design.

N82-13493/3 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
A Preliminary Estimate of Future Communications Traffic for the Electric Power System.
R. M. Barnett. 15 Oct 81, 73p NASA-CR-165015, JPL-PUB-81-41
Contracts NAS7-100, DE-AI01-79ET-29372

Diverse new generator technologies using renewable energy, and to improve operational efficiency throughout the existing electric power systems are presented. A description of a model utility and the information transfer requirements imposed by incorporation of dispersed storage and generation technologies and implementation of more extensive energy management are estimated. An example of possible traffic for an assumed system, and an approach that can be applied to other systems, control configurations, or dispersed storage and generation penetrations is provided.

N82-13494/1 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Measurement of Surface Recombination Velocity for Silicon Solar Cells Using a Scanning Electron Microscope with Pulsed Beam.
T. Daud, and L. J. Cheng. 1 Nov 81, 36p JPL-PUB-81-64, DOE/JPL-1012-56
Contracts NAS7-100, EX-76-A-29-1012

The role of surface recombination velocity in the design and fabrication of silicon solar cells is discussed. A scanning electron microscope with pulsed electron beam was used to measure this parameter of silicon surfaces. It is shown that the surface recombination velocity, s, increases by an order of magnitude when an etched surface degrades, probably as a result of environmental reaction. A textured front-surface-field cell with a high-low junction near the surface shows the effect of minority carrier reflection and an apparent reduction of s, whereas a tandem-junction cell shows an increasing s value. Electric fields at junction interfaces in front-surface-field and tandem-junction cells acting as minority carrier reflectors or sinks tend to alter the value of effective surface recombination velocity for different beam penetration depths. A range of values of s was calculated for different surfaces.

N82-13496/6 PC **A04**/MF **A01**
Solarex Corp., Rockville, MD.
A Module Experimental Process System Development Unit (MEPSDU).
Quarterly Report, 1 May - 31 Aug. 1981.
31 Aug 81, 57p NASA-CR-165014, QR-3
Contract JPL-955902
Sponsored in Part by Doe Prepared for JPL, Pasadena.

A cost effective process sequence and machinery for the production of flat plate photovoltaic modules are described. Cells were fabricated using the process sequence which was optimized, as was a lamination procedure. Insulator tapes and edge seal material were identified and tested. Encapsulation materials were evaluated.

N82-13499/0 PC **A03**/MF **A01**
Photowatt International, Inc., Tempe, AZ.
Development of Technique for AR Coating and Nickel and Copper Metallization of Solar Cells: FPS Project, Product Development.
Quarterly Technical Report, 15 May - 30 Sep. 1981.
C. G. Rominger. 15 Oct 81, 26p NASA-CR-165033, QTR-1
Contract JPL-955986
Prepared for JPL, Pasadena.

Silicon nitride and nickel pastes are investigated in conjunction with a brush copper plating process for the purpose of identifying one or more fabrication sequences which yield at least 10 percent efficient N(+)/P(+) flat plate solar cells. The adhesion of all nickel pastes is reduced significantly when subjected to acidic and alkaline brush copper plating solutions as a result of a combination of thermally induced stress and chemical attack of the frit, which occurs at the interface with the silicon solar cell. The AgF is penetrating the 800 a of Si3N4 and ohmic contact is occurring at all fire-in tempertures. During the brush plating process, fingers and buss bars tend to spread.

N82-13501/3 PC **A05**/MF **A01**
Spectrolab, Inc., Sylmar, CA.
High Resolution, Low Cost Solar Cell Contact Development.
Final Report.
N. Mardesich. 1981, 82p NASA-CR-165032, JPL-9950-611
Contract JPL-955725
Sponsored in Part by Doe Prepared for JPL, Pasadena, Calif.

The MIDFILM cell fabrication and encapsulation processes were demonstrated as a means of applying low-cost solar cell collector metallization. The average cell efficiency of 12.0 percent (AM1, 28 C) was achieved with fritted silver metallization with a demonstration run of 500 starting wafers. A 98 percent mechanical yield and 80 percent electrical yield were achieved through the MIDFILM process. High series resistance was responsible for over 90 percent of the electrical failures and was the major factor causing the low average cell efficiency. Environmental evaluations suggest that the MIDFILM cells do not degrade. A slight degradation in power was experienced in the MIDFILM minimodules when the AMP Solarlok connector delaminated during the environmental testing.

N82-13502/1 PC **A03**/MF **A01**
Solarex Corp., Rockville, MD.
Design, Fabrication, Test, Qualification, and Price Analysis of Third Generation Design Solar Cell Modules.
Final Design Report.
15 Oct 81, 33p NASA-CR-165007, JPL-9950-612
Contract JPL-955404
Sponsored in Part by Doe Prepared for JPL, Pasadena.

The fabrication of solar cell modules is detailed with emphasis upon laminating and interconnecting the panels that hold the simicrystalline silicon cells. Design problems and enviromental tests are described as well as performance characteristics.

N82-13503/9 PC **A07**/MF **A01**
Springborn Labs., Inc., Enfield, CT.
Investigation of Test Methods, Material Properties, and Processes for Solar Cell Encapsulants.
Annual Report.
P. B. Willis. Jun 81, 128p NASA-CR-165031, JPL-9950-613
Contract JPL-954527
Sponsored in Part by Doe Prepared for JPL, Pasadena, Calif.

Encapsulant materials and processes for the production of cost effective, long life solar cell modules are identified, and evaluated. Ethylene vinyl acetate lamination pottant studies are conducted with respect to the time/temperature cure requirements for successful use of this compound. The time needed to produce successful gel contents are redetermined at a variety of temperatures and are related to the peroxide half life temperature curve. Formulation of the butyl acrylate syrup casting pottant is complete. The formulation contains an ultraviolet stabilizer system and is cured with an initiator that presents no shipping or handling hazards. The catalyzed syrup is stable at room temperature and has a pot life of at least an eight hour period of time. The syrup cures to a transparent rubber in 18 minutes at a temperature of 60 C.

N82-13511/2 PC **A04**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Cell Module and Fuel Conditioner Development.
Quarterly Report, Jul. - Sep. 1981.
D. Q. Hoover, Jr.. Oct 81, 59p NASA-CR-165462, DOE/NASA/0161-9
Contracts DEN3-161, DE-AI01-80ET-17088

The results of pretesting and performance testing of Stack 564 are reported. The design features, progress in fabrication and plans for assembly of Stack 800 are given. The status of endurance testing of Stack 560 is reported. The design, fabrication, test procedures and preliminary tests of the 10 kW double counterflow reformer and the reformer test stand are described. Results of vendor contacts to define the performance and cost of fuel conditioning system components are reported. The results of burner tests and continuing development of the BOLTAR program are reported.

PATENT-4 302 791 Not available NTIS
Department of the Air Force, Washington, DC.
Power Supply Sequencing Apparatus.
Patent,
James E. Buchanan, and Daniel G. Damon. Filed 19 Sep 79, patented 24 Nov 81, 5p AD-D009 060/5, PAT-APPL-6-077 058
Supersedes PAT-APPL-6-077 058, AD-D006 770.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A power supply sequencing apparatus utilizing a pair of MOS-FET devices to simultaneously apply or remove the positive and negative power supply sources to an electronic unit. (Author)

PB82-143108 PC **A03**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Manual on Basic Electrical Design Features for Thermal Power Stations.
May 80, 38p PUB-145

This publication gives the details of the various items standardized in thermal power stations having units of 60 to 210 MW. These recommendations have been made based on the general consensus and the practices that are prevailing within and outside the country.

PB82-145640 PC **A05**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Standardisation of Design and Layout to Speed up the Construction of Thermal and Hydel Power Stations Held on the Occasion of Golden Jubilee Session of the Board, March 1977. Volume I: Thermal Power Stations.
Mar 77, 89p PUB-127-VOL-1
See also Volume 2, PB82-145657.

Contents:
- Standardization of design features of turbogenerators and associated equipment for speedy commissioning of power stations;
- Standardization of electrical equipment layouts for thermal stations with 200 MW generating machines;
- Evaluation of most economic steam velocity in long transmission lines;

Standardization of coal handling plant of thermal stations;
Standardization of basic electrical design concepts for thermal power stations having 200 MW generating machines;
Design and layout of water treatment system for a modern high pressure unit;
Standardizing design and layout to speed up construction of thermal power stations--observations and experiences;
Power station building for three 120 MW BHEL units at Chandrapura;
Quick and economic estimation in hydropower designs;
Present day concepts in the design and erection techniques of thermal power plants towards standardization;
and Standardization--To what extent.

PB82-145657 PC **A05**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Standardisation of Design and Layout to Speed up the Construction of Thermal and Hydel Power Stations Held on Occasion of Golden Jubilee Session of the Board, March 1977. Volume II: Hydro Power Stations and General.
Mar 77, 87p PUB-127-VOL-2
See also Volume 3, PB82-145665.

Contents:
Standardization of design and layout of hydroelectric power stations--scope and limitations;
Safeguards in standardization of design and layout of hydroelectric power stations for reducing construction time;
Guidelines for preliminary dimensioning of hydropower stations;
Installation of bulb turbine reduces the civil engineering work and construction period in comparison with the conventional Kaplan Turbine--a case study;
Interconnection between machine haul and switchyard in hydropower stations;
Expeditious completion of Dehradun power stations;
Some aspects of management of protective gear to eliminate delays in commissioning of generating stations;
Thermal and hydel projects in U.P.;
Random thoughts on standardization of some equipments in power stations to quicken the project completion;
Standardization of project management and implementation to speed up the construction of thermal power station;
Standardization in design and layout of low voltage switchgear to speed up construction of hydro and thermal power station projects;
and Standardization of design and layout to speed up the construction of thermal and hydel power stations.

PB82-145665 PC **A04**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Standardisation of Design and Layout to Speed up the Construction of Thermal and Hydel Power Stations Held on the Occasion of Golden Jubilee Session of the Board, March 1977. Volume III: General Reports and Discussions.
Aug 78, 63p PUB-127-VOL-3
See also Volume 1, PB82-145640.

Presents the discussion on the papers presented at the symposium.

PB82-145673 PC **A08**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings Forty-Sixth Research Session Held at Trivandrum, Kerala on 16-19 November, 1977. Volume V--Power: Technical Papers on Generation, Distribution, and Transmission.
Oct 77, 161p PUB-129-VOL-5

Contents:
Fixing MVA rating of generators;
Standardization of auxiliaries for 500 MW turbine generator thermal units;
Testing of large turbogenerator sets including field testing and special type tests;
Acid cleaning of condenser tubes of 140 MW units 5 and 6 at Dhuvaran Thermal Power Station;
A comparison between tidal power generation and conventional power generation in India;
Electrifying rural areas using two conductors;
Distribution losses in Haryana--a study of causes and remedies;
Development of optimum size, shape and material for H. T. Horn gap fuse;
Rostering of rural agricultural loads to reduce losses to the electricity boards on account of rural electrification;
Rationalization of steel sections for transmission line towers;
Oscillations and vibrations in EHV bundle conductor transmission lines;
Application of H.V.D.C. to regional tie lines in India;
Studies on insulator pollution;
A computer program for fast decoupled load flow solution;
Soil resistivity map and elimination of earthwire on transmission lines up to 132 kV in Punjab;
Simulation of operating conditions of U.P. grid--a new experiment in power system analysis;
Common causes of damage to transmission lines;
Finite element solution of electrostatic field under extra high voltage transmission iines;
and Increasing creepage distance of high voltage insulators by composite designing.

PB82-145699 PC **A07**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Proceedings Forty-Seventh Research Session Held at Hubli-Dharwar, Karnataka on 20-24 November, 1978. Volume V--Power: Technical Papers on Generation, Distribution, and General.
Oct 78, 132p PUB-132-VOL-5

Contents:
Preventive maintenance of high voltage insulation system of generators in service;
In-service evaluation of stator insulation of large hydrogenerators;
Replacement of generator winding at a hydro power station;
Failure of condenser tubes--a typical analysis;
Sea water corrosion of condenser tubes: causes and control--a review;
Unbalanced fault analysis for generator windings;
Factors governing selection of 500 MW rating for thermal generating units in India;
Some investigations of effects of short circuits in 11 kV PVC cables;
Earth fault protection of 400 V circuits;
Electrifying rural areas using two conductors--comparison with single phase earth return system;
Detachable horn gap fuse--operated through a hot stick;
Auto-transformer capacitor converter for running three-phase motors on single phase supply;
Development of automatic load staggering switch for agricultural loads in rural electrification;
Optimal capacity expansion in electricity generation system;
Dynamic stability analysis of two machine system;
Development of static phase angle meter;
and Some revelations from a survey of relay test methods.

PB82-148040 PC **E02**/MF **E02**
Commission of the European Communities, Luxembourg.
Development of Mono-Crystalline CdTe Solar Cells for Terrestrial Applications, Suitable for Use in Optical Concentrators (Entwicklung von Einkristallinen CdT-Solarzellen fuer Terrestrische Anwendung, Geeignet fuer den Einsatz in Optischen Konzentratoren).
Final rept.,
H. Jaeger, B. Fuessl, E. Seipp, and R. Thiel. c1981, 21p EUR-7033-DE
Text in German.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

Work to optimize the most important structural elements of solar cells based on mono-crystalline CdTe centered on two systems: (1) cells composed of n-CdTe crystals and a p-type heterolayer as window (here p-ZnTe); (2) cells composed of p-CdTe crystals and a n-type heterolayer as window (here n-CdS or indium-tin-oxide).

PB82-149675 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
Optimization of Silicon Solar Cells Intended to be Operated under Medium Solar Concentration.
Final rept.,
R. van Overstraeten. c1981, 42p EUR-7097-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

A limiting factor to the efficiency of solar cells is the series resistance of the cell. Computer programs have been developed in an effort to optimize the performance of solar cells with the type of metal grid structure devised by LEP, and intended to operate at a homogeneous concentration of light. Preliminary work has been done for non-homogeneous illumination.

PB82-149683 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
Development of Low Cost Cadmium Sulphide Sintered Ceramic Ribbon Solar Cells for Terrestrial Applications.
Final rept.,
G. V. Planer. c1981, 56p EUR-7083-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

Basic methods for the production of sintered ceramic ribbon solar cells have been established. Details are given of the methods used in the production of the indium doped cadmium sulphide starting materials and for the assessment of their electrical properties. The forming of this material into ribbons, or alternatively into discs, and their sintering are described, as well as their incorporation into solar cells and the assembly into arrays.

PB82-803719 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electric Power Consumption. 1977-November, 1981 (Citations from the NTIS Data Base).
Jan 82, 283p
Supersedes PB80-814072, and NTIS/PS-79/0774.
See also 1971-1976, NTIS/PS-78/0644.

Citations from Federally-funded research dealing with industrial, commercial, and residential aspects of electric power consumption and demand are presented. Topic areas cover the economics of supply as well as amount of consumption. A few citations cover projections of future demand and conservation measures to reduce electric power consumption. (This updated bibliography contains 276 citations, 66 of which are new entries to the previous edition.)

PB82-860743 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fossil-Fuel Power Plants and Power Generation: Economic Analysis. 1976-January, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Jan 82.
Jan 82, 433p
Supersedes PB81-857120.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography covers economic analyses and comparative evaluations for utility and industry operated fossil-fuel power generation. Various factors (operational, environmental, and technological) influencing fossil-fuel power generation are considered. Specific power generation methods, apparatus, and systems and specific geographic locations and experiences are discussed. (This updated bibliography contains 373 citations, 214 of which are new entries to the previous edition.)

PB82-861048 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nuclear Electric Power Generation: Economic Analysis. 1976-January, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Jan 82.
Jan 82, 193p

Supersedes PB81-856510.Prepared in cooperation with the Department of Energy, Washington, DC.

Citations in this bibliography cover economic considerations for various aspects of nuclear power generation. Comparative evaluations with other types of electric power generation are considered. Techniques and technology for siting, construction, operation, and decomissioning are assessed from an economic perspective. (This updated bibliography contains 175 citations, 115 of which are new entries to the previous edition.)

PB82-861220 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Power Plants: Economic Analysis. 1976-January, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Jan 82.
Jan 82, 343p
Supersedes PB81-856494.Prepared in cooperation with the Department of Energy, Washington, DC.

Citations in this bibliography cover economic analyses and assessments of solar power plants, solar power supplies, and solar energy systems. Techniques, technology, commercialization, and financial incentives for small-scale and large-scale, ground-based and satellite-based applications and apparatus are discussed. (This updated bibliography contains 306 citations, 140 of which are new entries to the previous edition.)

PB82-862095 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Inverter Converters. 1970-January, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 82.
Jan 82, 175p
Supersedes PB80-809080.

Cited works cover the field of electrical devices which convert direct to alternating current. Some of the applications discussed are motor and furnace drives, solar and wind generated electrical power conversion, variable-frequency devices for motor speed-control drives, and power frequency conversion devices. The components used in these devices, such as thyristors, SCRS, MOS devices, and the associated circuitries, are described in the cited reports. (This updated bibliography contains 137 citations, 46 of which are new entries to the previous edition.)

PB82-862103 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Inverter Converters. 1970-January, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 82.
Jan 82, 145p
Supersedes PB80-809098.

Cited works cover the field of electrical devices which convert direct to alternating current. Some of the applications discussed are motor and furnace drives, solar and wind generated electrical power conversion, variable-frequency devices for motor speed-control drives, and power frequency conversion devices. The components used in these devices, such as thyristors, SCRS, MOS devices, and the associated circuitries, are described in the cited reports. (This updated bibliography contains 158 citations, 33 of which are new entries to the previous edition.)

RFP-2920/3533/78/6-2 PC **A06**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
First Semiannual Report: Rocky Flats Small Wind Systems Test Center Activities. Volume II. Experimental Data Collected from Small Wind Energy Conversion Systems.
28 Sep 78, 109p
Contract EY-76-C-04-3533

Volume II of the First Semiannual Report of the Rocky Flats Small Wind Systems Test Center (WSTC) describes the nine (9) small wind energy conversion systems (SWECS) tested as of June 30, 1978 and provides the significant quantitative and qualitative data collected to that date. Meteorological data collected at Rocky Flats are also provided and described. (ERA citation 05:013481)

RFP-2974/3533-79-2 PC **A07**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Technical and Management Support for the Development of Small Wind Systems. Annual Report, October 1, 1977-September 30, 1978.
Feb 79, 147p
Contract EY-76-C-04-3533

The FY 1978 Annual Report of the Rocky Flats Wind Systems Program describes the objectives, approach, and achievements of the program and each of its tasks areas during the period October 1, 1977-September 30, 1978. During this period, additional testing of ten small wind energy conversion systems (SWECS) was conducted and the Test Center was expanded to accommodate up to 30 SWECS. Work on nine design and analysis projects for advanced prototypes in three size ranges progressed through a series of design reviews, with prototype delivery scheduled to begin in mid-1979. Supporting activities included a Systems Engineering project which analyzed the cost of SWECS components and fabrication, a task effort in technical support to standards development, and the dissemination of information. (ERA citation 05:015646)

RFP-3004(V.2) PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Rocky Flats Small Wind Systems Test Center Activities. Volume II. Controlled Velocity, Vibration and Dynamometer Testing of Small Wind Energy Conversion Systems. Second Interim Report.
Jul 79, 44p
Contract EY-76-C-04-3533

Information is presented on controlled velocity, vibration, and dynamometer testing performed on small wind energy conversion systems (SWECS) at Rocky Flats as of June 30, 1979. Results of controlled velocity testing on wind machines and of vibration testing of five wind machines are included. The Dynamometer Test Facility is still under development. (ERA citation 05:022299)

RFP-3014(V.1) PC **A13**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Small Wind Turbine Systems 1979, a Workshop on R and D Requirements and Utility Interface/Institutional Issues. Volume I. R and D Requirements.
D. M. Dodge, and J. V. Stafford. 1979, 299p CONF-790243-(V.1)
Contract EY-76-C-04-3533
SWECS 1979: a workshop on R and D requirements and utility interface/institutional issues, Boulder, CO, USA, 20 Feb 1979.

Separate abstracts are included for each of the papers presented concerning wind turbine systems development; systems engineering; siting; and testing. (ERA citation 05:022300)

RFP-3028/3533/79-12 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Dunlite-Model 81/002550 Wind Turbine Generator. Failure Analysis.
K. K. Higashi, M. J. Carr, and V. K. Grotzky. 1 Jun 79, 22p
Contract AC04-76DP03533

Optical and Scanning Electron Microscope examinations of a failed blade from a Dunlite Wind Turbine Generator were made to determine the mode of failure. The failure was a fatigue failure which began on the flat or upwind side of the blade. The mode of loading this area was reversed bending about an axis perpendicular to the long axis of the blade and in the plane of the sheet. The fatigue crack propagated around the blade until the blade finally failed by ductile overload processes. (ERA citation 05:020510)

SAN-1569-1(V.2)(Pt.2) PC **A15**/MF **A01**
Westinghouse Electric Corp., Lester, PA. Generation Systems Div.
Ocean Thermal Energy Conversion Power System Development. Phase I: Preliminary Design. Final Report.
4 Dec 78, 345p
Contract EG-77-C-03-1569

Westinghouse has completed the Preliminary Design Phase for the Power System Development of the Ocean Thermal Energy Conversion (OTEC) Demonstration Plant project. This study included the development of a preliminary design for a Modular Application scaled power system (10MWe) and Heat Exchanger Test Articles, both based on the concept developed in the Conceptual Design Phase. The results of this study were used to improve the baseline design of the 50MWe module for the Commercial Size Power System, which was recommended for the demonstration plant by the conceptual design study. The 50MWe module was selected since it has the lowest cost, and since its size convincingly demonstrates that future economically viable commercial plants, having reliable operation with credible anticipated costs, are possible. Additional optimization studies on the size of the power system plus hull continue to identify 50MWe as the preferred minimum cost configuration. This study was limited to a closed cycle ammonia power system module, using a seawater temperature difference of 40 exp 0 F, and a surface platform/ship reference hull. This volume describes system operation, a complete test program to verify mechanical reliability and thermal performance, fabrication and installation operations, and a cost analysis. (ERA citation 05:006757)

SAND-78-7040/2 PC **A12**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Regional Conceptual Design and Analysis Studies for Residential Photovoltaic Systems.
P. F. Pittman, and E. F. Federmann. May 80, 269p
Contract AC04-76DP00789

Solar residential photovoltaic energy systems suitable for incorporation into single-family residences were studied. The country was subdivided into ten regions, and the three best systems for each region were determined from the many possible system configurations, based on assumed subsystem costs and performance. Cost projections based on high volume production indicate that solar total energy systems would be viable. If a sufficiently comprehensive government program is forthcoming, they can be economicaly advantageous in some areas within 10 years and almost everywhere in the country by 2000. The three best system configurations found independent of the specific sites are those with combined electrical/thermal modules, electrical-only modules with a heat pump, and possibly separate side-by-side electrical and thermal arrays. Order of preference is determined by the site/structure characteristics. (ERA citation 05:031863)

SAND-79-7020(V.1) PC **A04**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Application Analysis and Photovoltaic System Conceptual Design for Service/Commercial/Institutional and Industrial Sectors. Volume I. Executive Summary. Final Report.
R. A. Whisnant, C. B. Morrison, N. G. Staffa, and R. D. Alberts. Dec 79, 58p
Contract EY-76-C-04-0789
P.

It is the objective of this study to examine the nature of potential applications of photovoltaics in the SCII sectors and to suggest the most appropriate areas for development of photovoltaic markets within those sectors. The results should provide both a qualitative and quantitative understanding of the technical and economic issues relevant to photovoltaics in the SCII sectors and serve to improve the effectiveness of future scientific and industrial development of this alternative energy source. This volume of the report is an executive summary containing the primary conclusions of the study and a concise review of the technical analysis. (ERA citation 05:015238)

SAND-80-1737 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Single Cell High Concentration Solar Test Facility.
B. E. Hammons. Sep 80, 36p
Contract AC04-76DP00789

A test facility is now in operation which measures performance data for photovoltaic cells over a wide range of concentration ratios (1 to 1500x) and temperatures (ambient to over 100 exp 0 C). The facility presently uses a 71 cm diameter Fresnel lens as the concentrator. The lens and solar cell (with appropriate cooling fixtures) are mounted on a 2-axis tracking pedestal which is positioned by a sun-seeking tracking device. The intensity of the incoming solar insolation is measured by a normal incidence pyrheliometer attached to this same tracking pedestal. Cell cooling is accom-

plished by the liquid impingement technique, and temperatures are held constant by a variable flow rate cooling loop using a 50/50 mixture of glycol/water as the coolant. Safety interlocks prevent the operator from being exposed to the high intensity solar radiation. Data acquisition and the associated instrumentation are controlled by a desk top computer. The computer also provides the user with a variety of cell parameters and methods of viewing the test results. (ERA citation 05:037823)

SAND-80-7072 PC **A03**/MF **A01**
Varian Associates, Inc., Palo Alto, CA.
Further Development of a Novel Solar Cell Concentrator Photovoltaic Converter System: Final Report.
H. A. Vander Plas, and P. E. Gregory. Oct 80, 49p
Contract AC04-76DP000789

Previously a photovoltaic converter using an optical filter to split the solar spectrum and focus the light onto two cells was built and tested. Conversion efficiencies for the test module ranged from 27.0% at 113 suns to 26.0% at 489 suns. The construction of this module was guided by a theoretical analysis of the efficiencies to be expected from a variety of bandgap combinations. The purpose of this program is to continue the investigation of all elements of the spectral splitting approach. A major emphasis of the program is the extension of the spectral splitting principle to a three-gap conveter. This includes the extension of the theoretical analysis to include the properties of the optical filter. The theoretical analysis is given, and the feedback provided by this analysis to the rest of the program is emphasized. Research on germanium, silicon, and AlGaAs/Al/sub x/Ga/sub 1-x/As solar cells is described. (ERA citation 06:004654)

SAND-80-8203 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Utility Views on Solar Thermal Central Receivers.
M. J. Fish. Apr 80, 67p
Contract EY-76-C-04-0789

The solar thermal central receiver concept has been the topic of discussion in recent meetings with a number of southwestern US utilities. These discussions focused on identifying technical demonstrations and government incentives necessary for commercializing the technology. The content of these meetings is summarized in this report, and the implications for a commercialization plan are discussed. (ERA citation 05:023858)

SERI/PR-0-8274-2 PC **A02**/MF **A01**
RCA Labs., Princeton, NJ.
Low-Cost Epitaxial Techniques for Solar-Cell Fabrication. Quarterly Technical Progress Report No. 2, 25 December 1979-24 March 1980.
R. V. D'Aiello, and P. H. Robinson. Apr 80, 25p
Contract EG-77-C-01-4042

Experiments were continued on the material characterization and epitaxial growth of solar-cell structures on three grades of a candidate low-cost upgraded metallurgical grade (UMG) silicon substrate. Enough epitaxial solar cells to characterize the baseline performance of cells on these three substrate grades were fabricated and tested. With a 15- mu m-thick epitaxial structure grown on the purest form of UMG substrate, an average cell AM-1 efficiency of 12.5% was obtained. Similar structures grown on the less pure multicrystalline substrate grades result in efficiencies of 9 to 10.3%. A novel way of slicing these substrates which exposes larger grain areas and results in higher cell efficiencies is described. The application of slow-cooling and gettering to the growth of thicker (equal to or greater than 50 mu m) epitaxial solar-cell structures was found ineffective. The use of alternate silicon gas sources was explored by using silane for the growth of cell structures. The initial results are encouraging and will be further pursued. (ERA citation 05:028615)

SERI/PR-0-8274-3 PC **A03**/MF **A01**
RCA Labs., Princeton, NJ.
Low-Cost Epitaxial Techniques for Solar-Cell Fabrication. Quarterly Technical Progress Report No. 3, 25 March-24 June 1980.
R. V. D'Aiello, and P. H. Robinson. Jul 80, 34p
Contract AC02-77CH00178

During the third quarter, the practical aspects of making epitaxial solar cells were emphasized by exploring the growth and fabrication of large-area cells. In this work, a significant achievement was the attainment of efficiencies close to 10% with epitaxial cells of 10.8 cm exp 2 area grown on the lowest grade silicon substrate under study. For larger areas (23.1 cm exp 2) an efficiency of 7.0% was obtained in the first experiment. The use of low-cost surface preparation techniques was successfully demonstrated for both epitaxial growth and the resultant solar-cell properties. Some requirements on the subsequent application of AR coatings are pointed out. Work on the use of silane as an alternate gaseous silicon source was extended by exploring growth on UMG silicon substrates. The results continue to show equivalent performance for cell structures grown in silane at 1000 exp 0 C with those grown using dichlorosilane at 1100 to 1150 exp 0 C. (ERA citation 05:033406)

SERI/PR-0-8276-3 PC **A04**/MF **A01**
RCA Labs., Princeton, NJ.
Thin-Film Polycrystalline Silicon Solar Cells. Technical Progress Quarterly Report No. 3, 25 March 1980-24 June 1980.
B. W. Sanghnan, J. Blanc, W. Phillips, and D. Redfield. Aug 80, 54p
Contract AC02-77CH00178

Thirty-four new solar cells were fabricated on Wacker Silso substrates and the AM-1 parameters were measured. A detailed comparison was made between the measurement of minority carrier diffusion length by the QE method and the penetrating-light laser-scan grain-boundary photoresponse linewidth method. The laser scan method has more experimental uncertainty and agrees within 10 to 50% with the QE method. It allows determination of L over a large area. Atomic hydrogen-passivation studies continued on Wacker material by three techniques. A method of determining surface recombination velocity, s, from laser scan data was developed. No change in s in completed solar cells after H-plasma treatment was observed within experimental error. H-passivation of bare silicon bars as measured by the new laser scan - photoconductivity technique showed very large effects. This method measures majority carrier effects which are sensitive to changes in GB barrier heights. Finally, H-passivation was studied in silicon-ITO heterojunction structures so that a phosphorus diffusion step was not necessary to observe minority carrier effects. Preliminary results showed a 50% reduction in s from 1.8 x 10 exp 5 cm/s to 1.2 x 10 exp 5 cm/s. However, both values are higher than what is observed in phosphorus-diffused cells, i.e., s = 7 x 10 exp 3 cm/s. Laser scans and QE measurements were carried out on three low-cost substrates: Crystal Systems cast silicon, Mobil-Tyco ribbon, and RCA epitaxial layer on Dow metallurgical grade substrate. Etching studies were initiated to observe dislocations and stacking faults in polycrystalline silicon. (ERA citation 05:033407)

SERI/PR-8119-2-T1 PC **A03**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Low-Cost Substrates for Polycrystalline Silicon Solar Cells by Electrodeposition Processes. First Quarterly Progress Report, October 1-December 31, 1979.
W. R. Gass, I. E. Kanter, and R. E. Witkowski. 14 Mar 80, 29p
Contract AC02-77CH00178

The goals of this program are to identify and develop economical processes for fabricating large grain size polycrystalline silicon substrates by electrodeposition techniques suitable for photovoltaic applications. Studies have begun to evaluate the technical feasibility for producing thin-film polycrystalline silicon sheet by molten salt electrolytic plating techniques. Purified metallurgical grade silicon and silica will be investigated as inexpensive feedstocks for the electrodeposition process. (ERA citation 05:033409)

SERI/PR-8119-2-T2 PC **A03**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Low-Cost Substrates for Polycrystalline Silicon Solar Cells by Electrodeposition Processes. Second Quarterly Progress Report, January 1-March 31, 1980.
W. R. Gass, I. E. Kanter, and R. E. Witkowski. 5 Jun 80, 43p
Contract AC02-77CH00178

The goals of this program are to identify and develop economical processes for fabricating large grain size polycrystalline silicon substrates suitable for photovoltaic applications. Studies have begun to evaluate the technical feasibility for producing thin-film polycrystalline silicon sheet by molten salt electrolytic plating techniques. Purified metallurgical grade silicon and silica will be investigated as inexpensive feedstocks for the electrodeposition process. Acid leaching has been shown to reduce the concentration of major photovoltaic performance affecting impurities by a factor of 10 or more. Large (10 to 50 mu m) silicon crystals have been successfully electroplated onto 1 cm x 1 cm substrate sheets. (ERA citation 05:033410)

SERI/PR-8802-9-T1 PC **A02**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
Novel Concepts in Electrochemical Solar Cells. First Quarterly Progress Report, May 15-July 15, 1979.
J. DuBow. 1979, 15p
Contract AC02-77CH00178

Emphasis has been directed toward the development and evaluation of an efficient, operational photoelectrochemical cell (PEC) system involving (i) molten salt (and/or highly concentrated, inorganic, non-aqueous) electrolytes, and (ii) the promising semiconductor electrode materials such as CuTnS sub 2 , CuInSe sub 2 , MoS sub 2 , MoSe exp 2 etc. As a direct consequence, the stages of the work program that are most critical at this time are the electrode fabrication and characterization and the electrolyte preparation and characterization phases. It has been demonstrated for the first time that a semiconductor electrode exhibits quite large photoeffects in a cell containing a molten salt electrolyte. Detailed studies are underway to explore the constraints and advantages of this type of electrolyte, from the standpoint of efficiency, corrosion of the electrode, and the chemical and physical properties related to overall cell performance. Progress is reported. (ERA citation 05:031859)

SERI/PR-9192-1-T1 PC **A03**/MF **A01**
Poly Solar, Inc., Garland, TX.
Thin Film Polycrystalline Silicon Solar Cells: First Technical Progress Report, April 15, 1980-July 15, 1980.
Jul 80, 30p
Contract AC02-77CH00178

The objectives of this contract are to fabricate large area thin film silicon solar cells with AM1 efficiency of 10% or greater with good reproducibility and good yield and to assess the feasibility of implementing this process for manufacturing solar cells at a cost of $300/kWe. Efforts during the past quarter have been directed to the purification of metallurgical silicon, the preparation of substrates, and the fabrication and characterization of solar cells. The partial purification of metallurgical silicon by extraction with aqua regia has been investigated in detail, and the resulting silicon was analyzed by the atomic absorption technique. The unidirectional solidification of aqua regia-extracted metallurgical silicon on graphite was used for the preparation of substrates, and the impurity distribution in the substrate was also determined. Large area (> 30 cm exp 2) solar cells have been prepared from aqua regia-extracted metallurgical silicon substrates by the thermal reduction of trichlorosilane containing appropriate dopants. Chemically deposited tin-dioxide films were used as antireflection coatings. Solar cells with AM1 efficiencies of about 8.5% have been obtained. Their spectral response, minority carrier diffusion length, and I/sub sc/-V/sub oc/ relation have been measured. (ERA citation 05:033412)

SERI/PR-9196-1-T1 PC **A02**/MF **A01**
Hughes Research Labs., Malibu, CA.
Indium Phosphide/Cadmium Sulfide Thin-Film Solar Cells. Quarterly Report, July-October 1980.
K. Zanio. Jan 81, 23p
Contract AC02-77CH00178

InP thin films were deposited by planar reactive deposition on recrystallized CdS (RXCdS) and semi-insulating (100) InP substrates and evaluated as potential layers for an all-thin-film solar cell. One objective of this period was to grow InP on RXCdS at a substrate temperature which is high enough to permit the growth of p-type material but yet low enough to permit the epitaxial growth of large grains. Films prepared on RXCdS at approximately 330 exp 0 C contained a mixture of grains having both large and submicron lateral dimensions. Be-doped epitaxial films, deposited on semi-insulating InP at 330 exp 0 C, showed both n- and p-type

behavior. Films prepared at higher temperatures with a freshly Be-charged indium source were p-type. However, at these temperatures, layers prepared after several runs with the same source were n-type. Analyses of the indium source and films were initiated to determine the cause of the transient doping. (ERA citation 06:015462)

SERI/SP-733-526 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
US Department of Energy Solar Thermal Energy Systems Program. An Overview Presentation, August 1979.
G. W. Braun. Jun 80, 38p CONF-7908122-1
Contract AC02-77CH00178
Solar Energy Industries Association meeting, San Jose, CA, USA, 9 Aug 1979.

Intended as both a position paper and a progress report to industry, this document provides a comprehensive overview of the US Department of Energy's Solar Thermal Program. Cost goals, systems design parameters, applications considerations, and the potential for industry involvement in solar thermal development and commercialization are described in detail. Decentralized management of R and D functions is linked to priorities and strategies of the evolving program. (ERA citation 05:034681)

SERI/TP-31-248(V.2)(Pt.1)
PC **A99**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Reliability of Materials for Solar Energy. Volume II, Part 1. Workshop Proceedings.
Oct 79, 707p CONF-781228-(V.2)(Pt.1)
Contract EG-77-C-01-4042
Reliability of materials for solar energy workshop, Denver, CO, USA, 18 Dec 1978.

The 35 papers presented were entered in the data base separately. (ERA citation 05:015249)

SERI/TP-623-656 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Biological Solar Cell.
M. Seibert, and A. F. Janzen. Apr 80, 5p CONF-800604-16
Contract EG-77-C-01-4042
American section of the International Solar Energy Society conference, Phoenix, AZ, USA, 2 Jun 1980.

Recent reports have demonstrated the possibility of employing photoactive, biological membrane components in photoelectrochemical cells. Present studies in our laboratories have led to the attachment of a much simpler biological complex, the bacterial photosynthetic reaction center isolated from Rhodopseudomonas sphaeroides, directly onto a SnO sub 2 semiconductor electrode. Light-induced photovoltages (70mV) and photocurrents (0.5 mu A/cm exp 2) not attributable to Dember effects have been observed in photoelectrochemical cells employing reaction-center-coated, SnO sub 2 working electrodes. Such reaction-center electrodes may serve as model systems for future organic photovoltaic devices. (ERA citation 05:023844)

SERI/TR-353-361(V.1)
PC **A07**/MF **A01**
Solar Energy Research Inst., Golden, CO.
International Photovoltaic Program Plan.
D. Costello, R. Koontz, D. Posner, P. Heiferling, and P. Carpenter. Dec 79, 128p
Contract EG-77-C-01-4042

The International Photovoltaics Program Plan is in direct response to the Solar Photovoltaic Energy Research, Development, and Demonstration Act of 1978 (PL 95-590). As stated in the Act, the primary objective of the plan is to accelerate the widespread use of photovoltaic systems in international markets. Benefits which could result from increased international sales by US companies include: stabilization and expansion of the US photovoltaic industry, preparing the industry for supplying future domestic needs; contribution to the economic and social advancement of developing countries; reduced world demand for oil; and improvements in the US balance of trade. The plan outlines programs for photovoltaic demonstrations, systems developments, supplier assistance, information dissemination/purchaser assistance, and an informaion clearinghouse. Each program element includes tactical objectives and summaries of approaches. A program management office will be established to coordinate and manage the program plan. Although the US Department of Energy (DOE) had the lead responsibility for preparing and implementing the plan, numerous federal organizations and agencies (US Departments of Commerce, Justice, State, Treasury; Agency for International Development; ACTION; Export/Import Bank; Federal Trade Commission; Small Business Administration) were involved in the plan's preparation and implementation. (ERA citation 05:018613)

SERI/TR-531-627 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Mist Lift Analysis Summary Report.
R. L. Davenport. Sep 80, 43p
Contract AC02-77CH00178

The mist flow open-cycle OTEC concept proposed by S.L. Ridgway has much promise, but the fluid mechanics of the mist flow are not well understood. The creation of the mist and the possibility of droplet growth leading to rainout (when the vapor can no longer support the mist) are particularly troublesome. This report summarizes preliminary results of a numerical analysis initiated at SERI in FY79 to study the mist-lift process. The analysis emphasizes the mass transfer and fluid mechanics of the steady-state mist flow and is based on one-dimensional models of the mist flow developed for SERI by Graham Wallis. One of Wallis's models describes a mist composed of a single size of drops and another considers several drop sizes. The latter model, further developed at SERI, considers a changing spectrum of discrete drop sizes and incorporates the mathematics describing collisions and growth of the droplets by coalescence. The analysis results show that under conditions leading to maximum lift in the single-drop-size model, the multigroup model predicts significantly reduced lift because of the growth of droplets by coalescence. The predicted lift height is sensitive to variations in the mass flow rate and inlet pressure. Inclusion of a coasting section, in which the drops would rise ballistically without change in temperature, may lead to increased lift within the existing range of operation. (ERA citation 05:037882)

SERI/TR-751-652 PC **A10**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Photovoltaics Information User Study.
W. W. Belew, B. L. Wood, T. L. Marie, and C. L. Reinhardt. Oct 80, 221p
Contract AC02-77CH00178

The results of a series of telephone interviews with groups of users of information on photovoltaics (PV) are described. These results, part of a larger study on many different solar technologies, identify types of information each group needed and the best ways to get information to each group. The report is 1 of 10 discussing study results. The overall study provides baseline data about information needs in the solar community. It covers these technological areas: photovoltaics, passive solar heating and cooling, active solar heating and cooling, biomass energy, solar thermal electric power, solar industrial and agricultural process heat, wind energy, ocean energy, and advanced energy storage. An earlier study identified the information user groups in the solar community and the priority (to accelerate solar energy commercialization) of getting information to each group. In the current study only high-priority groups were examined. Results from seven PV groups respondents are analyzed in this report: DOE-Funded Researchers, Non-DOE-Funded Researchers, Researchers Working for Manufacturers, Representatives of Other Manufacturers, Representatives of Utilities, Electric Power Engineers, and Educators. (ERA citation 06:004657)

SERI/TR-8170-1-T2 PC **A04**/MF **A01**
Hughes Research Labs., Malibu, CA.
Indium Phosphide/Cadmium Sulfide Thin-Film Solar Cells. Final Report, May 1979 Through July 1980.
K. Zanio. Sep 80, 71p
Contract AC02-77CH00178

Thin-film InP/RXCdS/ITO/GLASS devices were prepared by depositing ITO on low-cost glass substrate, depositing CdS on the ITO by thermal evaporation, increasing the CdS lateral grain size by recrystallization, and depositing p-type InP by planar reactive deposition (PRD) on the recrystallized CdS (RXCdS). Yields of the RXCdS/ITO/GLASS substrates were increased to 90% with lateral dimensions of the RXCdS grains as large as 0.3 mm. P-type InP layers were obtained with Be doping. S-doping via vapor transport from the CdS was eliminated by capping the entire RXCdS substrate with InP. For InP deposited on RXCdS at 380 exp 0 C, devices showed blocking action with a barrier height of about 0.5 V but no light response, possibly due to an intermediate approx. 3- mu m-thick n-InP layer from diffusion of S from the RXCdS. These results were achieved despite poor InP epitaxy due to an approx. 0.5- mu m-thick In-Cd-S transition layer between the InP and the RXCdS. InP films were subsequently deposited on RXCdS at the reduced substrate temperature of 280 exp 0 C to reduce S-diffusion and improve the quality of the epitaxy. Complete InP epitaxy on RXCdS was achieved with the lateral dimensions of the InP (approx. = 40 mu m) replicating that of the RXCdS. Given the increase in the concentration of n-type native defects as substrate temperature is decreased, the present lower limit for obtaining p-type InP by vacuum technologies appears to be about 300 exp 0 C. A 300 to 350 exp 0 C range of substrate temperature appears to befeasible for preparing large-grained p-type InP for both frontwall and backwall cell. However, if the thickness of the n-type layer due to S diffusion cannot be kept to less than a few thousand Angstroms, then development must be restricted to the frontwall cells. (ERA citation 06:007159)

SERI/TR-8272-1-T1 PC **A09**/MF **A01**
Solarex Corp., Rockville, MD.
Investigation of the Impurity Tolerance of Semicrystalline Silicon Solar Cells Silicon Impact Program. Final Report, September 15, 1979-September 14, 1980.
G. Storti, W. Regnault, S. Johnson, H. C. Lin, and R. W. Armstrong. 1980, 197p
Contract AC02-77CH00178

A considerable effort was directed to determine the mechanisms which limit efficiency in polysilicon solar cells. Specifically, the study was directed toward determining both the effects of impurities (for MG silicon material) and the microstructure of the polysilicon material on the electrical characteristics of solar cells fabricated from this material. Impurity effects were investigated using deep level transient spectroscopy (DLTS) to measure deep trap levels; optical emission spectroscopy and secondary ion mass spectroscopy (SIMS) were used to measure impurity levels. The effects of the crystal microstructure were investigated using electron channelling, angle lapping and staining measurements, x-ray topography, and scanning photoresponse measurements. Both reflection and transmission x-ray topographs of polysilicon material were obtained to reveal a range of microstructural features, including individual dislocations; subgrain boundaries, twin traces, and inclusions. The x-ray topographs were matched with optical scanning photoresponse measurements of the same region for which angle lapping results were obtained to show directly the effect of the microstructural features on the photoresponse of individual solar cells. A model is presented of these observations which gives emphasis to the individual effect of particular grain boundaries on reducing the photoresponse according to the dislocation content required to account for a portion of the misorientation across adjacent grains. The quality of the silicon grain volumes is the most important factor in determining the electrical response of polysilicon solar cells. Although the effect of impurities (for MG slicon material) on the quality of the grain volumes was not quantified, the incorporaton of impurities into the grain volumes is proposed to be, at least, indirectly related to the dislocation structure and that the electrical properties will be determined by the combination of the effects. (ERA citation 06:016662)

TELIC-80-3 PC **A05**/MF **A01**
TELIC Corp., Santa Monica, CA.
Cadmium Sulfide/Copper Sulfide Heterojunction Cell Research by Sputter Deposition. Quarterly Technical Progress Report, September 2-November 30, 1980.
J. A. Thornton, W. W. Anderson, and J. D. Meakin. 15 Dec 80, 77p
Contract AC02-77CH00178

Photoluminescence measurements of sputter-deposited CdS films have been made. In a first series of tests thin films of both doped and undoped CdS, deposited under reactive sputtering conditions typical of those used in previous cell fabrication, were found to be void of any photoluminescence emission in the visible spectrum. Subsequent tests of thicker films deposited under various conditions have shown emission from the undoped, but not from the doped, material. A post-deposition treatment process, where CdS films are

cooled following deposition in a flux of sputtered Cd, has proven to be the most effective method examined for producing off-stoichiometric coatings with low resistivities (< 100 omega -cm). The treated films are found to exhibit a photoluminescence emission. The modified apparatus with the vacuum interlock, that was assembled during the previous program, has permitted more controlled studies to be made on the influence of cathode and wall conditioning in the Cu sub 2 S reactive sputtering process. Experiments are reported which show that the conditioning times for achieving consistent Cu sub 2 S coatings are considerably longer than had previously been expected. The deposition of Cu sub 2 S coatings with consistent properties has been achieved, and hybrid cells have been fabricated with sputtered Cu sub 2 S deposited onto evaporated CdS supplied by IEC. A first series of cells have yielded J/sub sc/ approx. 13 mA/cm exp 2 , V/sub oc/ = 0.46 V, FF = 0.46, and eta = 2.7% after heat treatment at approx. 150 exp 0 C in Ar and H sub 2 . These results, though preliminary, indicate that optimization of the composition and thickness of the sputtered Cu sub 2 S should yield cells with efficiencies equivalent to those obtained with conventional ion exchange processing methods. (ERA citation 06:013620)

WASH-2330-78/4(V.1) PC **A04**/MF **A01**
Westinghouse Electric Corp., East Pittsburgh, PA.
Design Study and Economic Assessment of Multi-Unit Offshore Wind Energy Conversion Systems Application. Volume I. Executive Summary. Final Report.
L. A. Kilar. 14 Jun 79, 59p
Contract EX-76-C-01-2330

Information in presented concerning meteorological and oceanographic surveys of the US offshore; apparatus designs and costs; and OWECS system economics. (ERA citation 05:013443)

WASH-2330-78/4(V.3) PC **A09**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Systems Technology Div.
Design Study and Economic Assessment of Multi-Unit Offshore Wind Energy Conversion Systems Application. Volume III. System Analysis. Final Report.
L. A. Kilar. 14 Jun 79, 192p
Contract EX-76-C-01-2330

Optimum offshore wind energy conversion systems are described. The cost and performance of these systems are developed for a variety of conditions and the tradeoff between cost and energy production is made for the wide range of scenarios considered. The impact of the many design parameters on the major subsystems are briefly reviewed and the interactions which exist between subsystems are discussed. In particular, a section is devoted to dynamic interactions which might exist between the wind turbine generator (WTG) plant and the platform. (ERA citation 05:013483)

WASH-2330-78/4(V.4) PC **A15**/MF **A01**
Westinghouse Electric Corp., East Pittsburgh, PA.
Design Study and Economic Assessment of Multi-Unit Offshore Wind Energy Conversion Systems Application. Volume IV. Meteorological and Oceanographic Surveys. Final Report.
L. A. Kilar. 14 Jun 79, 344p
Contract EX-76-C-01-2330

The results are presented of a survey of the meteorology and oceanography of the United States offshore as they pertain to the design, cost, emplacement, operation and maintenance of offshore wind energy conversion systems (OWECS). This report is intended to define the environment in which OWECS are to be considered. (ERA citation 05:013489)

10C. Energy Storage

AD-A108 727/9 PC **A03**/MF **A01**
Frank J. Seiler Research Lab., United States Air Force Academy, CO.
Low Temperature, Chloroaluminate Thermal Cells. Final rept.,
Robert L. Vaughn. Nov 81, 39p Rept no. FJSRL-TR-81-0012

This report summarizes the results of single cell studies on thermal cells containing sodium tetrachloroaluminate electrolyte. The best performing cells delivered 100 Wh/kg at a lifetime of 143 minutes to 75% of initial closed circuit voltage. Such cells operated at 200 C at a current density of 15mA/sqcm. A limited photomicroscopy study revealed a reaction between the lithium alloy anode and separating electrolyte when the cell is stored at 80 C. MoO2CL2 and Et4N(MoCl6) were studied as possible alternate molybdenum cathodes, but these materials did not show promising performance. (Author)

N82-13508/8 PC **A03**/MF **A01**
Life Systems, Inc., Cleveland, OH.
Endurance Test and Evaluation of Alkaline Water Electrolysis Cells.
Annual Report.
K. A. Burke, and F. H. Schubert. Nov 81, 46p NASA-CR-165424, TR-376-16
Contract NAS3-21287

Utilization in the development of multi-kW low orbit power systems is discussed. The following technological developments of alkaline water electrolysis cells for space power application were demonstrated: (1) four 92.9 cm2 single water electrolysis cells, two using LST's advanced anodes and two using LST's super anodes; (2) four single cell endurance test stands for life testing of alkaline water electrolyte cells; (3) the solid performance of the advanced electrode and 355 K; (4) the breakthrough performance of the super electrode; (5) the four single cells for over 5,000 hours each significant cell deterioration or cell failure. It is concluded that the static feed water electrolysis concept is reliable and due to the inherent simplicity of the passive water feed mechanism coupled with the use of alkaline electrolyte has greater potential for regenerative fuel cell system applications than alternative electrolyzers. A rise in cell voltage occur after 2,000-3,000 hours which was attributed to deflection of the polysulfone end plates due to creepage of the thermoplastic. More end plate support was added, and the performance of the cells was restored to the initial performance level.

N82-13547/6 PC **A03**/MF **A01**
Horstmann G.m.b.H., Heiligenhaus (Germany, F.R.).
A Central Microprocessor Controlled Electrical Storage Heating System.
Final Report.
H. Horstmann. Dec 80, 26p BMFT-FB-T-80-182, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The use of a microprocessor to control the reloading of electrical storage heaters not only during the night, but whenever the electrical grid is cycled down, was tested. The test setup, used to control a total of about 10 MW installed storage heating in 96 dwellings, is described. It is demonstrated that additional consumers can be connected to the system without demand for more power stations.

SAND-79-2259 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Mechanical Energy Storage for Photovoltaic/Wind Project. Final Report.
B. C. Caskey, and H. E. Schildknecht. Jun 80, 66p
Contract AC04-76DP00789

This report describes the Solar Mechanical Energy Storage Program at the time that Lawrence Livermore Laboratory assumed the responsibility for it. It also presents contractor and system analyses results for residential flywheel energy-storage systems (FESS). Various phases of the program have addressed small-to-intermediate applications of photovoltaic/wind-energy storage using flywheels, compressed air, and low-head, underground pumped-hydro technologies. Sandia National Laboratories' recommendations for continued work in specific areas are included. (ERA citation 05:031864)

UCID-18561 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Evaluation of Air Cathodes for Potential Use in Development of Aluminum-Air Cells.
J. W. Pyper, B. E. Kelly, and J. F. Cooper. Dec 79, 38p
Contract W-7405-ENG-48

Four air cathodes representing the products of three manufacturers were tested under conditions of continuous and intermittent polarization in order to determine their suitability for testing large-scale aluminum-air single cells. Polarization tests on 25-cm exp 2 samples were conducted at 60 exp 0 C in flowing electrolyte (6 M NaOH + 1.4 M Al(OH) sub 3 + 0.06 M Na sub 2 Sn(OH) sub 6), over the current density range, 0 to 8 kA/m exp 2 . Continuous polarization tests were conducted under these conditions at 1.3 kA/m exp 2 for up to 312 hours. Intermittent tests consisted of alternate periods of polarization at 1.3 kA/m exp 2 for 1 hour under the above conditions, and standby at open circuit in cold, stationary, supersaturated caustic aluminate solutions for up to 24 h. The W electrode performed for 312 h with a decrease of potential of 0.11 V at 1.3 kA/m exp 2 . The X standard electrode failed to sustain continuous polarization for longer than 12 h. Both W and Z electrodes met or nearly met polarization requirements in the Request for Proposal No. 6352009. The tests demonstrated that the W electrode is sufficiently durable and low in polarization to be used for testing 0.1-m exp 2 aluminum-air cells. 17 figures, 6 tables. (ERA citation 05:015856)

UCRL-52841(V.2) PC **A13**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Energy Storage Systems for Automobile Propulsion: 1979 Study. Volume 2. Detailed Report.
H. C. Forsberg, C. J. Anderson, and E. Behrin. 15 Dec 79, 288p
Contract W-7405-ENG-48

The results are given for FY 1979 of a national multilaboratory study of energy-storage propulsion systems for automobiles. The findings of the four participating panels are presented, including a technical and cost update for the energy-storage devices and resultant vehicles. In addition, an evaluation methodology is described for national energy and market impact, a manufacturing and service infrastructure study is introduced, and an examination is made of certain specialty markets. The 1979 study continues to project the energy-storage device characteristics and evaluates the resulting vehicles. The systems analyzed included several that were not considered in the 1978 work, and three that had not been previously evaluated: the short-range but high-performance all-electric vehicle; the hydrogen-fuel-cell-powered electric; and the advanced-battery eV, power boosted with an advanced-design, fiber-composite flywheel. (ERA citation 05:019096)

11.
MATERIALS

11A. Adhesives and Seals

PAT-APPL-6-300 767 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Tool Sealing Arrangement and Method.
Patent Application,
Walter Leodolter. Filed 10 Sep 81, 15p AD-D009 045/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention provides a tool sealing arrangement and method designed to satisfy the aforementioned needs. The unique feature of the present invention is the use of the peripheral area of the titanium sheet metal assembly itself to form a tool seal, thereby eliminating the necessity for a separate seal. This peripheral area is the normal trim-off area of the formed titanium component. By using the titanium sheet metal assembly to form the seal, no matching requirements are imposed on the tools because the expanding titanium material adjusts to the gap between the tools. This leads to a low cost tooling system. Surface preparation of the tools is not critical because the plasticity of the titanium material accommodates surface roughness and geometrical deviations from the theoretical surface. Accordingly, the present invention is directed to a

tool sealing arrangement for use in superplastic forming and diffusion bonding apparatus which includes upper and lower tools. The sealing arrangement is formed by the peripheries of a pair of metal blanks having effective strain rate sensitivity to be formed into a component assembly by the apparatus. The metal blanks are located between the tools with spaced apart inner and outer marginal peripheral edge portions of the blanks being connected together and expanded away from one another at a predetermined pressure greater than the working pressure between the tools. The expanded peripheral edge portions of the blanks form a seal between the blanks and tools which prevents outside atmospheric gases from entering between the tools.

PATENT-4 291 887 Not available NTIS
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Modified Face Seal for Positive Film Stiffness.
Patent,
I. Etsion, and A. Lipshitz. Filed 7 Nov 79, patented 29 Sep 81, 4p N82-12442/1, PAT-APPL-6-092 145 Supersedes PAT-APPL-6-092 145, N80-12414 (18 - 03, p 0334).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

The film stiffness of a face seal is improved without increasing the sealing and dam area by using an apparatus which includes a primary seal ring in the form of a nose piece. A spring forces a sealing surface on the seal ring into sealing contact with a seat to form a face seal. A circumferential clearance seal is formed in series with this face seal by a lip on the piece. The width of the surface of the lip is subsntially the same as the width of the sealing surface on the face seal and the clearance between the surface on the lip and the shaft is substantially the same as the spacing between the face sealing surfaces on the face seal when the shaft is rotating. The circumferential clearance seal restricts the flow of fluid from a main cavity to an intermediate cavity with a resulting pressure drop. The hydrostatic opening face is strongly dependent on the face seal clearance, and the desired axial stiffness is achieved.

PB82-145210 PC **A02**/MF **A01**
Norsk Treteknisk Inst., Oslo.
Longterm Durability of Structural Adhesives for Wood: Results after 10 Years Exposure (Langtidsbestandighet av lim for Baerende Trekonstruksjoner: Resultater etter 10 Ars Eksponering),
Eirik Raknes. Jul 76, 11p MEDDELELSE-53, ISBN-82-7120-009-7
Text in Norwegian, summary in English.

The long-term durability of 14 different adhesives is being investigated. The experiment is described in detail in a separate report, which is a progress report after 2 years' exposure. Test results after 6 years' exposure are given in a separate report. This report contains test results after 10 years' natural aging, using test pieces as shown.

SAND-80-0215 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Glass-Ceramics for Lightning Arrestor Connector Seals.
C. J. Leedecke. Mar 80, 29p
Contract AC04-76DP00789

High dielectric constant glass-ceramics were developed for the use in lightning arrestor connectors. Ferroelectric glass-ceramics were formulated in the Na sub 2 O.Nb sub 2 O sub 5 .Al sub 2 O sub 3 .SiO sub 2 and Bi sub 2 O sub 3 .TiO sub 2 .B sub 2 O sub 3 systems. The most effective nucleating agents for producing NaNbO sub 3 in the Na sub 2 O.Nb sub 2 O sub 5 .Al sub 2 O sub 3 .SiO sub 2 system were SiC and Si. Glass-ceramics based on this sytem have a fine-grained structure, zero porosity when heat-treated in air, and dielectric constants at 100 kHz of up to 70. Glass-ceramics in the Bi sub 2 O sub 3 .TiO sub 2 .B sub 2 O sub 3 system contain the ferroelectric Bi sub 4 (TiO sub 4) sub 3 phase. These glass-ceramics have dielectric constants of 85 which are frequency independent in the 10 exp 2 to 10 exp 5 Hz region. Upon crystallization, virtually all of the TiO sub 2 is in the Bi sub 4 (TiO sub 4) sub 3 phase. The formation of hermetic seals in an Ar atmosphere was hampered by porosity. (ERA citation 05:024429)

STUDSVIK-77-3(rev.ed.) PC **A06**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Full-Scale Demonstration. Fire Testing of a System for Penetration Sealing Based on Foamed Silicone Elastomer: Studsvik 77-05-26.
A. Brown. Jun 78, 118p
U.S. Sales Only.

Testing of a system for making fire retardant penetration seals based on foamed-in-place silicone elastomer is described. The report covers - Concept of fire retardant penetration seals and the Chemtrol system, Design FC 225 - Account of materials used to prepare seals and method of application - Test assembly and full-scale facility at Studsvik - Classification of seals used in demonstration - Diagrams of seals and photographs taken after demonstration. (Atomindex citation 10:430554)

11B. Ceramics, Refractories, and Glasses

AD-A108 234/6 PC **A03**/MF **A01**
Air Force Weapons Lab., Kirtland AFB, NM.
Surface Statistics Investigations.
Final rept.,
Richard A. House, II. Oct 81, 45p Rept no. AFWL-TR-81-40

Results are reported of two investigations on surface structural properties of optical glasses. One project dealt with surface profiling analyses of a set of fused silica samples which had previously been laser damage tested. The other project had to do with the roughening of polished quartz and BK7 glasses by extended periods of ultrasonic cleaning. (Author)

AD-A108 581/0 PC **A09**/MF **A01**
San Fernando Labs., Pacoima, CA.
Investigation of the CNTD Mechanism and Its Effect on Microstructural Properties of SiC and AlN.
Final rept.,
Deepak G. Bhat, and Rodney M. Panos. Sep 81, 188p AFOSR-TR-81-0748
Contract F49620-79-C-0041

The report describes the development of a CNTD process for silicon carbide. Following earlier work on resistance-heated substrate, attempts were made to develop a furnace process for CNTD SiC. High temperature flexure testing of SiC-coated graphite bend bars showed that the CNTD SiC was superior to other conventional SiC materials over the whole range of temperatures tested. Problems were encountered in attaining uniformity and repeatability of the material. All deposits tested showed a two-phase structure of Si and SiC. Highly variable compressive surface stresses were observed by XRD techniques. Attempts to develop a CNTD process for AlN were not successful. However, grain refinement and improvement in physical properties were achieved when AlN deposits were 'doped' with Si. The electrical and thermal properties of CVD AlN were comparable to other AlN materials. The IR transmittance characteristics were found to be inferior, possibly due to impurities in the deposit. (Author)

AD-A108 646/1 PC **A04**/MF **A01**
Advanced Mechanical Technology, Inc., Newton, MA.
Hard-on-Hard (Ceramic) Long-Life Seals and Riders for Cryogenic Coolers.
Final rept. Jun 79-Oct 80,
Forest J. Carignan, and Alan I. West. Aug 81, 63p AFWAL-TR-81-4060
Contract F33615-79-C-5029

A reciprocating pin-on-plate apparatus was designed and constructed for the testing of friction and wear characteristics of ceramic materials. The machine was specifically constructed to conduct tests at cryogenic temperatures in a pressurized (300 psig maximum) helium atmosphere. Cryogenic testing was not accomplished but 17 ceramic materials were screened at room temperature in 15 psig helium. As a result of the screening tests, the materials were rank ordered according to their wear, and friction coefficients were tabulated. Several ceramics performed as well or better than fluorogold, a currently used seal material. Recommendations were made concerning additional materials to be tested and the materials characterizations needed for data analysis. (Author)

N82-13154/1 PC **A04**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
A Preliminary Analysis of the Data from Experiment 77-13 and Final Report on Glass Fining Experiments in Zero Gravity.
Final Report.
W. R. Wilcox, R. S. Subramanian, M. Meyyappan, H. D. Smith, and D. M. Mattox. 1981, 64p NASA-CR-161884
Contract NAS8-33017

Thermal fining, thermal migration of bubbles under reduced gravity conditions, and data to verify current theoretical models of bubble location and temperatures as a function of time are discussed. A sample, sodium borate glass, was tested during 5 to 6 minutes of zero gravity during rocket flight. The test cell contained a heater strip; thermocouples were in the sample. At present quantitative data are insufficient to confirm results of theoretical calculations.

11C. Coating, Colorants, and Finishes

PAT-APPL-6-294 095 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
New Surface in Cellulosic Fibers by Use of Radio-frequency Plasma of Ammonia.
Patent Application,
Truman L. Ward. Filed 19 Aug 81, 12p PB82-148578
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a process for producing a polymeric-type film or coating in the surface of cellulosic fiber.

PB82-861196 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Phosphate Coatings: Aluminum and Aluminum Alloys. 1966-January, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jan 82.
Jan 82, 54p

The use of phosphate coatings for the protection of aluminum and aluminum alloys is discussed in the cited reports. Phosphate surface treatment prior to the use of spray coating or painting is emphasized. The effect of phosphating on corrosion resistance is also presented. (Contains 81 citations fully indexed and includes a title list.)

PB82-861204 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Phosphate Coatings: Carbon Steels. 1966-January, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jan 82.
Jan 82, 66p

The use of phosphate coatings for the corrosion protection of carbon steels is discussed. The phosphate pretreatment of metal surfaces prior to painting or coating of steels is also included. Factors contributing to the substrate, pretreatment, coating combination as it applies to the effectiveness of corrosion protection are emphasized. (Contains 95 citations fully indexed and includes a title list.)

PB82-861857 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vitreous Enamel Coatings. 1966-January, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jan 82.
Jan 82, 105p
Supersedes PB81-860272.

Citations in this bibliography cover properties, performance, and a wide variety of uses for vitreous enamel coatings. Vitreous enameling techniques and process-

es are considered as are effects of the enamel on coated materials and objects. (This updated bibliography contains 184 citations, 13 of which are new entries to the previous edition.)

11D. Composite Materials

AD-A108 201/5 PC **A05**/MF **A01**
Universal Energy Systems, Inc., Dayton, OH.
A Digital Algorithm for Composite Laminate Analysis - Fortran.
Final rept. 3 Jul 80-1 Jun 81,
Som R. Soni. Sep 81, 86p AFWAL-TR-81-4073
Contract F33615-79-C-5129

This report presents a FORTRAN computer code for the solution of composite materials problems. The computer program can conduct the point stress analysis of general laminates including hybrid laminates. The effect of hygrothermal and mechanical loads on the strength of composite laminates can be studied using this program. The analytical formulas based on the lamination theory have been used. A complete listing of the computer programs is given. A number of typical laminates have been treated for numerical illustrations. Input and output parameters are explained in detail. The algorithm is written in an easily understandable format. At the most, the program can take care of eight materials and twenty plys. For problems containing more materials and plys, the corresponding dimensions are to be increased in the main program and related subroutines. Material properties for six different materials are given in the input data cards. The required material properties can be used by giving a corresponding material property identification number in the layers data card. These quantities are given in SI units. If the results are desired in English units (i.e., Psi etc.), a unit identification number not equal to 1(-2), has to be used.

AD-A108 233/8 PC **A06**/MF **A01**
Ashland Chemical Co., Columbus, OH.
Improved Graphite Fiber Adhesion.
Final rept. 10 Sep 79-11 Jun 81,
G. Gynn, R. N. King, S. F. Chappell, and M. L. Deviney. Sep 81, 122p AFWAL-TR-81-4096
Contract F33615-79-C-5060

Several different commercial graphite fibers were characterized as to surface chemistry by XPS analysis, radiotracer analysis, thermal desorption/mass spectrometry, and surface energetics via contact angle measurements. These fibers were then treated by selective oxidation and devolatilization. Various interphase resins were then electrodeposited on the fibers. Composites were made from three matrix resins using the electrodeposited fibers and tested before and after exposure to moisture aging. No improvement in shear strength due to the electrodeposited interphase resins was noted. (Author)

PB82-142316 PC **A07**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Damage Development Mechanisms in Notched Graphite Epoxy Composite Laminates during Compressive Fatigue Loading,
Norman Frederick Black. Nov 81, 149p VPI-E-81.34

This study has investigated the damage development mechanisms in notched graphite epoxy composite laminates during constant amplitude compressive fatigue loading. Laminates of two different stacking sequences were tested. The effect of the center notch on local stress-strain behavior during static loading, and the relationship between fatigue damage and the resulting life, stiffness, and strength of the laminates have been observed.

PB82-860941 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fiber Reinforced Composite Laminates. 1977-January, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1977-Jan 82.
Jan 82, 81p

Citations in this bibliography include polymer chemistry analyses of fiber reinforced polymeric composite laminates. Mechanical properties of various synthetic and natural fibers relative to deterioration rates, fibrous reinforcement of thermoset and thermoplastic composites, and test procedures and results for fabric reinforced composite laminates are among the topics discussed. Applications and molding developments are also included. (Contains 76 citations fully indexed and includes a title list.)

SAND-80-0104C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Room-Temperature Transverse Compressive Creep of Thick Kevlar Fabric/ Epoxy Laminates.
R. H. Ericksen, and T. R. Guess. 1980, 20p CONF-801010-3
Contract AC04-76DP00789
12. National Society for the Advancement of Materials and Process Engineering technical conference, Seattle, WA, USA, 7 Oct 1980.

Creep and recovery of thick Kevlar 49/epoxy composites were investigated in transverse compressive loading at room temperature. Cylindrical samples with void contents of 4 and 14 percent were tested along with those of unreinforced resin. The composites exhibited logarithmic creep. Creep rates were 2 times higher over the entire stress range for the high porosity composites. At a stress of 87 MPa the resin creep curve was similar to that of the composites. At higher stresses, the resin crept faster and exhibited more strain. It is proposed that axial compressive creep of the cylindrical composite specimens is governed by Poisson induced strains leading to tensile loading of the reinforcing fibers. Axial initial strain and creep rate data for the composite were converted to radial data using measured values of Poisson ratio. These values of composite specimen radial creep rate were in good agreement with tensile creep data of Kevlar 49 fibers. (ERA citation 05:032601)

11E. Fibers and Textiles

PAT-APPL-6-272 872 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Zwitterion Compounds as Catalysts in Easy-Care Finishing.
Patent Application,
Robert M. Reinhardt. Filed 12 Jun 81, 15p PB82-148594
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to chemical finishing processes for textiles. More particularly it relates to catalysts for treatment of cellulose-containing textile materials with cross-linking agents to produce easy-care properties.

PAT-APPL-6-302 007 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Textile Finishing Agents from Reaction Products of Carbamates and Glutaraldehyde.
Patent Application,
John G. Frick. Filed 15 Sep 81, 12p PB82-148529
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention concerns a new treatment for fabric composed entirely or in part of cellulose to impart wrinkle-resistance and durable-press properties without release of formaldehyde.

PAT-APPL-6-302 008 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Process for Modifying Cellulosic Fabrics for Improved Heat Transfer Printing.
Patent Application,
Eugene Blanchard. Filed 15 Sep 81, 13p PB82-148586
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to heat transfer printing fabrics with dispersed dyestuffs.

PB82-138256 PC **A02**/MF **A01**
Forschungsinstitut Berghof G.m.b.H., Tuebingen (Germany, F.R.).
Production of Improved Silicon Carbide Filaments for Composite Material.
Final rept.,
Philip Gruber. 1981, 25p BMFT-FB-T-79-177
Trans. of unidentified German mono., n.p., n.d. See also German report N81-21139.

Three possibilities for reducing the manufacturing costs of silicon carbide filament were investigated experimentally. The results indicated that the conventional tungsten substrate can be replaced by a less expensive carbon substrate and that the production rate of the filament can be increased by employing a longer reactor. With the third possibility for cost reduction, larger diameter filaments, the tensile strengths of the filaments were not satisfactory. Employing the carbon substrate in conjunction with the higher production rate, however, an estimated savings of 50 percent could be realized in large scale production costs compared to the previous state of the art.

11F. Metallurgy and Metallography

AD-A108 146/2 PC **A03**/MF **A01**
Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
Shipboard Exposure Testing.
Progress rept.,
E. J. Jankowsky, and S. J. Ketcham. 9 Sep 81, 30p Rept no. NADC-81075-60

An effort is underway to correlate results of accelerated laboratory corrosion tests with actual shipboard exposure of aircraft materials. This report compares results of corrosion tests of a series of aluminum alloys with varying degrees of exfoliation resistance exposed on the flight decks of nuclear and conventional carriers. Results of exposure of laser hardening paints, water displacing paint, aluminum/aluminum oxide and graphite/epoxy composites are also described. Additionally, results of initial laboratory tests are given. (Author)

AD-A108 328/6 PC **A03**/MF **A01**
Atomic Energy Research Establishment, Harwell (England).
The Oxidation of Dilute Iron-Silicon Alloys ((Si) < or = 1 w/o) in Carbon Dioxide,
P. T. Moseley, G. Tappin, and J. C. Riviere. Feb 81, 41p Rept nos. AERE-R-10042, HL81/515

The manner in which silicon, present as a minor alloy constituent, modifies the oxidation of iron in CO2/1% CO at 500 degrees C has been studied. Increasing amounts of silicon progressively reduce the oxidation rate within the range (Si) = 0-1w/o and a variety of physical techniques have been used to examine oxidized specimens in pursuit of the origins of this beneficial influence. The scale forming on the alloys is composed of two layers in each of which iron is present as Fe3O4. The inner layer of scale contains silicon at approximately the same level (on a volume % basis) as the original metal while the outer scale appears to contain no silicon. The boundary between the two layers is also marked by an abrupt change in grain size and in texture of the Fe3O4. At the boundary between the alloy and the scale there develops a thin layer of nonferrous material in which the concentration of silicon is increased by more than an order of magnitude above that in the bulk alloy. This layer also includes a substantial accumulation of carbon which is thought to derive from carbon oxide gases which have penetrated to the base of the scale before taking part in the oxidation reaction.

AD-A108 361/7 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Effects of Microstructure and Frequency on Corrosion-Fatigue Crack Growth in Ti-8Al-1Mo-1V and Ti-6Al-4V.
Final rept.,
G. R. Yoder, L. A. Cooley, and T. W. Crooker. 8 Dec 81, 18p Rept no. NRL-MR-4678

Fatigue crack growth studies were conducted on Ti-8Al-1Mo-1V and Ti-6Al-4V alloys in 3.5% NaCl aqueous solution. Each alloy was studied in two microstructural conditions and at two cyclic frequencies. The Ti-8Al-1Mo-1V was heat treated to produce a fine-grained duplex anneal microstructure and a coarse-

grained Widmanstatten microstructure resulting from a beta anneal. The two microstructural conditions for the Ti-6Al-4V were an as-received mill anneal and a beta anneal. The two cyclic frequencies were 01. and 5.0 Hz. Each of the four alloy/microstructure combinations studied has been the subject of prior investigation regarding fatigue crack growth rate/microstructure interactions in ambient air environments. For both alloys, crack growth rates in air were found to be significantly reduced as a result of microstructural modifications associated with the beta anneal heat treatment. Although the salt water environment significantly accelerated crack growth rates for both alloys, this same ranking of fatigue crack growth resistance persisted in the present study. Both microstructures of the Ti-6Al-4V alloy exhibited a frequency crossover effect; in contrast, no significant frequency effects were observed in the Ti-8Al-1Mo-1V, in either microstructure. Similar frequency effects were seen in separate specimens cycled at a single constant frequency or in single specimens cycled at two alternating frequencies. Out-of-plane cracking was observed in both alloys in the beta annealed condition. The effects of varying degrees of out-of-plane cracking on apparent crack growth rates are noted. (Author)

AD-A108 548/9 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Comparison of Notch-Stress with Strain-Controlled Low Cycle Fatigue of Alpha-Beta Titanium Alloys.
Memorandum rept.,
J. M. Krafft, and G. R. Yoder. 4 Dec 81, 13p Rept no. NRL-MR-4697

Prior studies of the present authors provided two different tests of low cycle fatigue endurance of the same set of titanium alloys. Strain controlled push-pull deformation of axial specimens covered crack initiation life of up to 1000 cycles. Notch stress controlled tensile load cycling extended the range to 1 million cycles. All of Ti-6Al-4V, the test materials varied in oxygen content and in effective grain size. The results could not be compared directly because of the disparity in the controlling variables; strain and stress excursions respectively. It is found that both kinds of data form a consistent set if the total stress excursion is used as a basis of comparison, except for cases of overly high notch loading. The earlier strain-controlled results were modeled by a cumulative cyclic creep strain criterion for crack initiation. This criterion appears to embrace also the notch stress results, thus providing a promising means for extrapolating fatigue data. (Author)

AD-A108 552/1 PC **A03**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Metallurgy, Mechanics and Material Science.
PACER LIME. Part II. Experimental Determination of Environmental Corrosion Severity.
Final rept. 15 Sep 78-31 Dec 79,
Robert Summitt, and Frederick T. Fink. Jun 80, 35p
AFWAL-TR-80-4102-PT-2
Contract F33615-78-C-5224
See also Part 1, AD-A100 496.

Atmospheric exposure of aircraft alloys was conducted to provide experimental data in support of an environmental rating system. Alloys tested were magnesium AZ31B, 4340 steel, aluminum 2024-T3 Alclad, 7075-T6, 7079-T6 Alclad, and titanium-6Al-4V. Test sites were nine in the continental U.S., one in Hawaii, and one in England. Measured corrosion rates are in good agreement with literature values and USAF corrosion maintenance experience. (Author)

AD-A108 654/5 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Metallurgy and Mining Engineering.
The Effect of Hydrogen on the Solid Solution Strengthening and Softening of Nickel.
Technical rept.,
J. Eastman, F. Heubaum, T. Matsumoto, and H. K. Birnbaum. Nov 81, 34p
Contract N00014-75-C-1012

The effects of hydrogen on the plastic deformation of nickel and nickel-carbon alloys were studied using plastic deformation techniques over a wide range of strain rates at about 300 K. The emphasis of the study was on the behavior at very low strains and low strain rates. Hydrogen was introduced as a solute element by quenching from a gaseous H2 atmosphere or by testing in a gaseous H2 atmosphere. The behavior of a number of different purities of nickel with hydrogen additions was examined. The most significant impurity element seemed to be C and this element was varied over a wide composition range by annealing in different atmospheres. Both solution softening and solution strengthening was observed depending on the amount of H in solution relative to the amount of C in solution. The nature of this solution softening is discussed. (Author)

AD-A108 691/7 PC **A05**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Fatigue Microcrack Behavior under the Influence of Surface Residual Stresses.
Interim rept. 1 Aug 80-31 Aug 81,
John E. Hack, and Gerald R. Leverant. 30 Oct 81, 77p
Contract N00014-78-C-0674

Direct observations of the surface crack opening displacement (SCOD) of surface microcracks (2c to approximately 400 microns) have been made on samples of 4140 and HY-130 steels under both cyclic and static loading conditions. Preliminary observations indicate that small cracks which reside entirely within the zone of shot-peen-induced compressive residual stress remain completely closed, even at applied loads approaching the bulk yield stress in HY-130. Results of SCOD measurements on HY-130 specimens which were cycled in an aqueous 3.5% NaCl solution show a large reduction in SCOD (effective delta K) due to a wedging open of the crack by oxides on the crack faces. As far as we know, the results of these near-threshold, low R-ratio tests represent the first direct observations of oxide wedging effects in microcracks and are consistent with independent data for large crack behavior. Predictions using the analytical approach developed earlier in this program give excellent correlation with experimental observations in 4140 steel in the absence of surface residual stresses. Similar analyses are currently being conducted for HY-130. In addition, a boundary-integral program for the direct calculation of crack face displacements is being used to determine complete crack opening profiles in the presence of a surface residual stress gradient. (Author)

AD-A108 710/5 PC **A02**/MF **A01**
Battelle Columbus Labs., OH.
Mechanical-Property Data CT 91-T7E69 Aluminum, Powder Metallurgy Product.
Sep 81, 10p
Contract F33615-80-C-5168

CT 91-T7E69 aluminum alloy is a powder metallurgy product of Alcoa. The material was received as two 1-1/2-inch thick x 4-1/2-inch wide x 4-foot lengths. The CT 91 aluminum was received in the T7E69 condition. This temper was designed to have good static strength and fatigue resistance. Results of these tests show higher tensile, shear, and fatigue data as compared to the T7E70 temper while giving lower fracture toughness values.

IS-4750 PC **A03**/MF **A01**
Ames Lab., IA.
Alloy Evaluation for Fossil Fuel Process Plants (Liquefaction). Quarterly Report, 1 April-30 June, 1980.
C. M. Woods, and T. E. Scott. 15 Jul 80, 37p
Contract W-7405-ENG-82

The average thermal expansion coefficient for Carpenter 883 (H-13, the bolt material for bolt loaded compact tension specimens) was determined for the temperature range 72 exp 0 F to 800 exp 0 F. The thermal stability, as a function of time, was determined at 800 exp 0 F. The average thermal expansion coefficients for both A387-74A-Gr.22-Cl.2 steel and 316 stainless steel were determined for the 72 exp 0 F to 1000 exp 0 F temperature range. Thermal stability of A387 at 1000 exp 0 F was monitored for a period of 250 hours. Smooth-bar and notched-bar tensile specimens of A387-74A-Gr.22-Cl.2 steel were exposed to 4000 psig H sub 2 gas at 1000 exp 0 F for 168, 250 and 500 hours. Samples were exposed in the unstressed, stressed, and prestrained conditions. Tensile tests were made in air at room temperature at the end of each exposure. Metallographic examinations were made of fracture surfaces as well as other exposed specimens not subjected to the tensile testing. The exposed material exhibited a marked reduction in notch ductility as well as a small reduction in notch tensile strength. The smooth-bar samples showed no significant changes in mechanical properties even after 500 hours of exposure. SEM examinations revealed the presence of small bubbles that formed mostly on or near grain boundaries and in the vicinity of second phase particles. Specimens cleaved at liquid nitrogen temperature exhibited bubbles on the fracture surface. Fatigue crack growth rates (da/dN) were determined for a wide variation of stress intensity range values (delta K). Testing was done in hydrogen gas at ambient temperature and various pressures. Near-threshold to rapid crack growth stages were examined. (ERA citation 06:004463)

N82-13216/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
An Improved Stress Corrosion Test Medium for Aluminum Alloys.
T. S. Humphries, and J. E. Coston. Nov 81, 11p
NASA-TM-82452

A laboratory test method that is only mildly corrosive to aluminum and discriminating for use in classifying the stress corrosion cracking resistance of aluminum alloys is presented along with the method used in evaluating the media selected for testing. The proposed medium is easier to prepare and less expensive than substitute ocean water.

N82-13217/6 PC **A02**/MF **A01**
Pittsburgh Univ., PA. Dept. of Metallurgical and Materials Engineering.
Investigation into the Role of NaCl Deposited on Oxide and Metal Substrates in the Initiation of Hot Corrosion.
Semiannual Report, 1 Apr. - 1 Oct. 1981.
N. Birks. 1 Oct 81, 24p NASA-CR-165029, SAR-3
Contract NAG3-44

Morphological aspects of the conversion to Na2SO4 of NaCl deposits over the temperature range 500-700 C, in air with added SO2 and H2O. Progress of the reaction was observed by withdrawing samples at various times and examining them under the scanning electron microscope using EDAX to assess the extent of chloride to sulfate conversion. These initial results show that the conversion to Na2SO4 proceeds directly on the sodium chloride surface as well as on the surrounding substrate due to evaporation of NaCl from the solid particle. The mechanism of this reaction could involve reaction in the vapor to produce Na2SO4 which then deposits, alternatively Na2SO4 could form directly on the substrate surface due to direct reaction there between the vapors NaCl, SO2 and O2.

N82-13218/4 PC **A12**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
A Quantitative Study of Factors Influencing Lamellar Eutectic Morphology During Solidification.
W. F. S. Kaukler. Nov 81, 263p NASA-TM-82451

The factors that influence the shape of the solid-liquid interface of a lamellar binary eutectic alloy are evaluated. Alloys of carbon tetrabromide and hexachloroethane which serve as a transparent analogue of lamellar metallic eutectics are used. The observed interface shapes are analyzed by computer-aided methods. The solid-liquid interfacial free energies of each of the individual phases comprising the eutectic system are measured as a function of composition using a 'grain boundary groove' technique. The solid-liquid interfacial free energy of the two phases are evaluated directly from the eutectic interface. The phase diagram for the system, the heat of fusion as a function of composition, and the density as a function of composition are measured. The shape of the eutectic interface is controlled mainly by the solid-liquid and solid-solid interfacial free energy relationships at the interface and by the temperature gradient present, rather than by interlamellar diffusion in the liquid at the interface, over the range of growth rates studied.

ORNL/TM-7554 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Effect of Microstructure on the Susceptibility to Hydrogen Attack.
R. O. Williams. Nov 80, 12p
Contract W-7405-ENG-26

We analyzed how the departure from internal equilibrium in low-alloy steels is associated with a variable carbon activity. This is perceived to be of considerable importance in the susceptibility of such steels to hydro-

gen attack. Solving this problem has three parts. First, one must have an adequate thermodynamic description of the phases in coexistence. Second, one must be able to calculate the carbon activity as a function of the degree of partitioning of the alloy additions to the carbide phases. Finally one must be able to calculate the kinetics of the partitioning. According to the presently available information, these problems apparently can be solved analytically with a useful level of precision. (ERA citation 06:005073)

PB82-135435 PC **A03**/MF **A01**
Bureau of Mines, Washington, DC.
Cobalt Availability--Domestic: A Minerals Availability System Appraisal.
Information circular,
Gary R. Peterson, Donald L. zleiwas, and Paul R. Thomas. Oct 81, 39p BUMINES-IC-8848

The Bureau of Mines evaluated the potential supply of cobalt from known domestic resources, both as a primary product from some deposits and as a byproduct from others, and found that U.S. production could play an important role in meeting U.S. cobalt needs by the mid-1980's. This production would be of a relatively short duration, however, with production declining significantly before the year 2000. As part of the study, a tonnage-price relationship was developed indicating the quantity of cobalt that could be produced from known cobalt-bearing deposits at various primary commodity prices and at a 15-percent rate of return on the required capital investment. All capital and operating costs are calculated in August 1980 dollars, and commodity prices are based on August 1980 prices.

PB82-140997 PC **A03**/MF **A01**
National Inst. for Metallurgy, Randburg (South Africa).
The Determination, by Differential Pulse Anodic-Stripping Voltammetry at the Thin Mercury-Film Electrode, of Cadmium and Thallium in Six NIMROC Reference Materials.
A. F. Lee. 25 Sep 81, 31p NIM-2128, ISBN-0-86999-553-7
Synopsis in South African and English.

A previously reported procedure has been extended to include the determination of thallium. In samples where thallium occurred in the presence of relatively high concentrations of cadmium, the stripping peak for cadmium was first suppressed with a non-ionic surface-active agent, Triton X-100. Cadmium and thallium were determined directly in six NIMROC reference materials without interference from iron(III), in a reducing electrolyte, which is also a complexing agent, consisting of 1 M ammonium chloride, 0, 1M citric acid, and 0,025M ascorbic acid. Interelement interferences were eliminated by the use of a mercury-film electrode of adequate thickness. The limits of detection for cadmium were 10ng/g and those for thallium 20ng/g.

PB82-141045 PC **A02**/MF **A01**
Bureau of Mines, Rolla, MO. Rolla Research Center.
Electrolytic Method for Recovery of Lead from Scrap Batteries.
Rept. of investigations,
E. R. Cole, Jr., A. Y. Lee, and D. L. Paulson. Nov 81, 25p BUMINES-RI-8602
Library of Congress catalog card no 81-607109.

Bench-scale research at the Bureau of Mines has resulted in the successful development of a combination electrorefining-electrowinning method for recycling all the lead in scrap batteries. The method reduces energy consumption and eliminates toxic emissions, in contrast to present pyrometallurgical smelting, and the lead produced is pure enough for use in maintenance-free batteries.

PB82-145418 PC **A05**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Research Center.
Process for Recovering Chromium and Other Metals from Superalloy Scrap.
Rept. of investigations,
J. J. deBarbadillo, J. K. Pargeter, and H. V. Makar. Nov 81, 82p BUMINES-RI-8570
Library of Congress catalog card no. 81-6102.

This Bureau of Mines report describes a process for recovering chromium and other metals from superalloy scrap. Laboratory-scale experiments were conducted to test a complex flowsheet utilizing a wide range of extractive metallurgical operations. The novel basis for the process is the formation of a sulfide matte in which chromium is concentrated in a discrete chromium sulfide phase. Mineral processing and hydrometallurgical procedures are used to separate chromium sulfide from the other matte constituents. The products of the process are a chromium-nickel alloy suitable for reuse in the superalloy industry, electrolytic nickel, electrolytic cobalt, and iron-molybdenum residue. Recovery of the principal elements contained in the scrap is chromium--93 percent, nickel--99 percent, cobalt--96 percent, and molybdenum--92 percent.

PB82-145426 PC **A02**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Research Center.
A Pyrometallurgical Method for Processing Ni-Cd Scrap Batteries.
Rept. of investigations,
Donald A. Wilson, and Harry V. Makar. Nov 81, 20p BUMINES-RI-8574
Library of Congress catalog card no. 81-10151.

As part of a continuing effort to maximize metal recovery from domestic secondary resources, the Bureau of Mines investigated a process for recovering the metallic portion of scrap alkaline batteries. A pyrometallurgical method for recovering nickel and cadmium from Ni-Cd scrap batteries previously developd on a laboratory scale, was scaled up to 25- and 43-pound charges. The method employed reduction and/or decomposition in a retort using a minimum of 2.5 percent carbon as a reductant. Metallic cadmium was distilled at atmospheric pressure and a minimum of 900C. Purity of the recovered cadmium was 99.8 percent minimum and the nickel-iron residue contained less than 0.02 percent cadmium.

PB82-149360 PC **A06**/MF **A01**
National Materials Advisory Board (NRC), Washington, DC.
Assessment of Selected Materials Issues.
Final rept.
Sep 81, 106p NMAB-381
Contract LC-79-118

In a two-day seminar, the National Materials Advisory Board made an assessment of present and potential problems in the availability of steel, titanium, aluminum, and cobalt. The assessment covered selected conceivable events that could effect availability but did not predict the probability that such events would occur. Occurrence was assumed--i.e., What if the domestic production base for aluminum begins to move off-shore.--and possible consequences were considered in the form of series of questions. Consensus answers or solutions were not sought and no attempt was made to do an in-depth literature study. The purpose was to identify the important questions to be considered. Concerns were raised that call for careful attention and continuing analysis, but none emerged that appear to warrant crisis action. The report includes an introductory description of the origin and scope of the assessment, an overall summary and analysis, summaries of the discussion and questions raised for each material, a background paper provided for thought prior to the seminar, and formal papers by invited experts on the current status of each of the four metals.

PB82-861329 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Amorphous Alloys: Cobalt Base. 1966-January, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jan 82.
Jan 82, 208p
Supersedes PB81-858938.

The magnetic properties of cobalt base alloys are discussed in terms of the amorphous nature of this alloy group. Emphasis is placed on thin film and magnetostriction devices. The effect of structure and alloying elements on magnetic properties is also emphasized. (This updated bibliography contains 237 citations, 122 of which are new entries to the previous edition.)

PB82-862137 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Magnesium Alloys : Corrosion Properties. 1970-January, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 82.
Jan 82, 98p
Supersedes PB81-857153.

The corrosion of magnesium base alloys is discussed in the cited reports. Emphasis is placed on stress corrosion cracking, metal fatigue, and hydrogen embrittlement. The phenomenon of preferential attack at grain boundaries is also included. A wide variety of light metal alloys based on magnesium is discussed. (This updated bibliography contains 73 citations, 15 of which are new entries to the previous edition.)

RFP-Trans-285 PC **A02**/MF **A01**
Density Measurements at High Temperatures. Part XII. Specific Volume and Expansion of Magnesium-Zinc Alloys in the Solid and Liquid States.
E. Pelzel, and F. Sauerwald. 1941, 7p
Contract AC04-76DP03533
A, Z. Metallkd. 33 n6 P229-232 1941.

The specific volume of magnesium-zinc alloys as a function of concentration was determined at various temperatures in the solid and liquid state up to 800 exp 0 C. The alloys form in this entire range, with considerable contraction which, in particular, suggests the existence of intermetallic compounds in the liquid state. This observation is of special importance for the magnesium-zinc alloys because it is comparable with determinations of the same problem by other methods, and thus is confirmed. The measurements also yielded shrinkage values in the entire range and at the solidification point. (ERA citation 05:033883)

SERI/TP-731-756 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Thermoelectric Properties of Bismuth-Antimony Thin Films.
J. Treffny, and T. S. Jayadev. Jul 80, 6p CONF-800806-39
Contract AC02-77CH00178
15. intersociety energy conversion engineering conference, Seattle, WA, USA, 18 Aug 1980.

Thermoelectrics have a wide range of potential applications in the temperature range of 0 exp 0 to 100 exp 0 C. In an effort to enhance the feasibility of thermoelectrics, we have begun investigation of potentially cheaper materials and cheaper techniques for thermoelectrics. Two features of bismuth and antimony have influenced our work. First, Horst and Williams have reported quite respectable figure of merit values in bulk single crystals of bismuth-antimony, up to 2.5 x 10 exp -3 at room temperature. Second, bismuth and antimony are an order of magnitude cheaper in cost compared to selenium and tellurium, making this binary alloy a natural candidate to reduce the cost of thermoelectric devices. Our avenue of approach involves a simplification of the fabrication process using an established technique of solid-state electronics: thin-film deposition. We have recently begun to investigate the extent to which the favorable properties of bulk Bi-Sb are preserved in thin films. Some of the preliminary data coming out of this ongoing investigation are reported. (ERA citation 05:036798)

UCID-18600(Pt.1) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Hot Hollow Cathode Plating Process Upgrade Proposal.
J. A. Arluck, and W. N. Massey. 20 Sep 79, 30p
Contract W-7405-ENG-48

The Vacuum Operations Group has designed and built three vacuum coating systems that use a hot hollow cathode source. Highly adherent silver coatings applied with the hot hollow cathode source on joint interfaces are being used to make solid-state bonds between dissimilar metals. Joint strengths exceeding the yield of the weaker metal are achieved. This is a combined cleaning and coating process that eliminates the problems of recontamination between the cleaning and coating cycles. Another advantage of this process is that thick silver coatings (127 to 254 m) can be applied at high rates, and the piece parts can then be machined to the required dimensions. A distributed control system based on a LSI-11 and two 8085 microprocessors is proposed to upgrade the present manual-only Hot Hollow Cathode Control System to multiple-mode operation, including turn-key. The LSI-11 will monitor and react to the water, air, and argon supplies, power supplies, and vacuum pressures throughout the system. (ERA citation 05:022643)

Y-2217 PC **A03**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Corrosion Evaluation of Cooling-Water Treatments for Gas Centrifuge Facilities.
C. R. Schmidt, and P. F. Meredith. 24 Nov 80, 38p

Contract W-7405-ENG-26

The corrosion resistance of six different types of weighted metal coupons was evaluated at 29 exp 0 C (84 exp 0 F) in flowing water containing nitrite-borate-silicate corrosion inhibitors. The question for evaluation was whether it would be more advantageous: (1) to drain the treated cooling water from the centrifuge machine and to expose them to moisture-laden air over an assumed shop downtime and repair perid of 1 month; or (2) to let the treated cooling water remain stagnant in the machines during this downtime. The moisture-laden-air exposure was more detrimental. (ERA citation 06:003503)

11G. Miscellaneous Materials

NUREG/CR-2315 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
The Effect of Pretreatment on the Initial Reaction Rates of PGX and H451 Graphites with H2O and O2,
M. Eto, and F. B. Growcock. Sep 81, 19p BNL-NUREG-51447
Contract DE-AC07-76CH00016

Initial reaction rates were examined for PGX and H451 graphites exposed to different atmospheres prior to oxidation in 2% H2O/He or 2% O2/N2. Exposure to ambient air or 2% H2O/He at room temperature caused high initial reaction rates of PGX and H451 graphites oxidized in 2% H2O/He at 750 degree C or 800 degree C, which may be attributed to oxidant adsorption prior to oxidation. High initial reaction rates were not observed when the specimens were xposed to He without H2O before oxidation. Exposure of the graphites to inert gas at 750 or 800 degree C resulted in very high initial reaction rates, especially in the case of PGX graphite; this phenomenon may be attributed to catalysis by metallic impurities which are activated upon reduction by the graphite matrix.

11H. Oils, Lubricants, and Hydraulic Fluids

SLAC-PUB-2528 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Materials and Lubrication for Gear and Bearing Surfaces in Uhv.
R. E. Kirby, G. J. Collet, and E. L. Garwin. Jun 80, 4p CONF-800928-2
Contract AC03-76SF00515
International vacuum congress/ 4. international conference on surface science and 3. European conference on solid surface, Cannes, France, 22 Sep 1980.

During design and construction of the SLAC polarized LEED (PLEED) system, a search was made for a dependable gear, bearing, and lubrication system for the computer-controlled Faraday cup used to measure diffracted beams. Components must be nonmagnetic, bakeable to 250 exp 0 C, and at room temperature must operate at pressures in the 10 exp -9 to 10 exp -10 Pa range. A test system was constructed which incorporated a meshed pair of dissimilar pitch diameter spur gears, one of which was confined to (by bushings) and rotated on a fixed shaft, while the other gear was driven by a commercial rotary motion feedthrough which was rotated by a servo motor driven in sine fashion with a direction reversal every six turns and peak speeds of 50 rpm. The criterion for a successful pair was approx. 10 exp 5 turns, the life rating for the feedthrough. Pairs had actual turn counts from less than 1 to 91,000. Materials for gears included stainless steel, beryllium copper, and aluminum alloys. Lubricants used singly and in concert were MoS sub 2 , WS sub 2 , Ag, hard chrome, and a MoS sub 2 -graphite-sodium silicate mixture. The successful gear pair was Ag-plated Al alloy and MoS sub 2 -graphite-sodium silicate-coated Be-Cu. Subsequent performance in the PLEED system after repeated bakeouts will also be discussed. (ERA citation 05:032682)

11I. Plastics

AD-A108 267/6 PC **A05**/MF **A01**
Dayton Univ., OH. Research Inst.
Determining Crack Tip Field Parameters for Elastic-Plastic Materials via an Estimation Scheme.
Interim rept. Nov 79-Nov 80,
T. Weerasooriya, and J. P. Gallagher. Jul 81, 82p UDR-TR-80-132, AFWAL-TR-81-4044
Contract F33615-78-C-5184

This report reviews the theoretical basis of an estimation scheme which appeared in the literature. A computer program was written for estimating the elastic-plastic fracture mechanics parameters for five different crack geometries. The parameters evaluated are J-integral, load-line displacement, and crack mouth opening displacement. Included in the report are the program listing and an example of an input and output. (Author)

AD-A108 491/2 PC **A03**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Dept. of Chemistry.
Ab-Initio MODPOT/VRDDO/MERGE Calculations on Energetic Compounds. I. Mechanism of Initiation of Cationic Polymerization from Electrostatic Molecular Potential Contour Maps,
Frank L. Tobin, P. C. Hariharan, Joyce J. Kaufman, and Richard S. Miller. 15 Oct 81, 28p
Contract N00014-80-C-0003
Presented at the Sanibel International Symposium on Atomic, Molecular and Solid State Theory, Palm Coast, Fl., Mar 81, Paper 13.

Experimentally it had been observed in 1969 for cyclic ethers with conventional substituents that their propensity to polymerize was influenced by their basicities and ring strain. For energetic new polymers it was desired to predict their propensity to polymerize of cyclic ethers substituted with energetic groups prior even to synthesis of monomers themselves. We carried out ab-initio quantum chemical calculations on these energetic cyclic ethers and generated the electrostatic molecular potential contour maps. These maps indicate vividly the basicities of the cyclic ethers and permit the relative ranking of their tendencies to polymerize. The maps also allow optimal choice of good copolymer candidates. (Author)

AD-A108 519/0 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Chemical Engineering.
Properties of Multiphase Polyurethane Systems.
Final rept. 1 Jul 80-30 Jun 81,
Stuart L. Cooper. Aug 81, 42p
Contract N00019-80-C-0367

The objective of this research was to explore the influence of morphology on the structure-property relationships of polyvinylchloride-polyurethane blend systems. Studies on blends of a segmented polyether polyurethane ET-38-1 with PVC were carried out utilizing differential scanning calorimetry (DSC), Rheovibron, stress-strain, infrared peak positions studies, and infrared dichroism experiments. As determined from DSC and Rheovibron data, THF-dioxane solution casting and melt processed samples are incompatible while THF solution casting produced a partially compatible polyurethane-PVC blend. However, similar uniaxial stress-strain data on all three series of samples indicate substantial polyether (soft segment of polyurethane) plasticization effect upon PVC, and therefore all of the blends can be considered as mechanically compatible. This produces useful blend systems of satisfactory mechanical properties with the PVC acting as a polyurethane stiffening agent. Such blends also exhibit improved flammability characteristics which are inherent to the PVC component. This is especially valuable in foamed elastomer or plastic applications.

PAT-APPL-6-300 838 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Cure Retarding Additives for Acetylene-Terminated Polymers.
Patent Application,
Theodore J. Reinhardt, Jr. Filed 10 Sep 81, 13p AD-D009 046/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

In accordance with the present invention, it has been found that the addition of a hydroxy-substituted, polynuclear, aromatic compound to an acetylene-terminated polymer, as a cure retarding or processing additive, reduces significantly the melt viscosity of the polymer during its curing cycle thereby prolonging the melt state of the molten material to allow for easy processing. The use of the processing additives of this invention, such as 1 -napthol, 2 -napthol, chlorohydroquinone, monohydroxyanthroquinone, dihydroxyanthroquinone and dihydroxynapthalene, in amounts of from about one to twenty weight percent, solve the processing problems caused by the high melt viscosity of previously used acetylene-terminated polymers. Also, the use of the additives of this invention, especially with acetylene-terminated polyimides, allows the rather high level of cross-linking to be reduced in a controlled manner to produce a more fracture resistant, cured polymer. Accordingly, the primary object of this invention is to provide acetylene-terminated oligomeric and polymeric materials that demonstrate an enhanced capability for use in the fabrication of a variety of structural elements for aerospace systems.

PB82-803289 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Heat Resistant Plastics: Silicone, Carborane, Halocarbon, and Other Polymers. 1976-August, 1980 (Citations from the NTIS Data Base).
Jan 82, 256p

The bibliography excludes nitrogen containing polymers but presents research on other heat resistant plastics and elastomers. The citations mainly pertain to the following resins: Polysilicones, polycarboranes, phosphorus containing polymers, and halocarbon polymers. The chemical properties, synthesis, physical and mechanical properties, applications and fabrication of these polymers are covered. (This updated bibliography contains 249 citations, none of which are new entries to the previous edition.)

PB82-803297 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Heat Resistant Plastics: Silicone, Carborane, Halocarbon, and Other Polymers. September, 1980-December, 1981 (Citations from the NTIS Data Base).
Jan 82, 57p
Supersedes PB80-814734, NTIS/PS-79/0950, and NTIS/PS-78/0770.

The bibliography excludes nitrogen containing polymers but presents research on other heat resistant plastics and elastomers. The citations mainly pertain to the following resins: Polysilicones, polycarboranes, phosphorus containing polymers, and halocarbon polymers. The chemical properties, synthesis, physical and mechanical properties, applications and fabrication of these polymers are covered. (This updated bibliography contains 50 citations, all of which are new entries to the previous edition.)

PB82-861295 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electromagnetic Shielding Polymers. 1973-January, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Jan 82.
Jan 82, 62p

Electromagnetic shielding by means of electrically conducting plastics is discussed in the cited reports. Emphasis is placed on composite materials, vacuum metallizing, graphite-epoxy laminates, metal filled urethanes, and sprayable shielded coatings. Applications include sheilding of electronic assemblies, cabinets for business machines and televisions, as well as domestic appliances. (Contains 55 citations fully indexed and includes a title list.)

PB82-861303 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electromagnetic Shielding Polymers. 1975-January, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 82.
Jan 82, 76p

Electromagnetic sheilding by means of electrically conducting plastics is discussed in the cited reports.

Applications include infrared instrumentation, laser devices, coated coaxial cables, and conductive gaskets. The reflectivity of flame sprayed coatings as well as vacuum metallizing are also discussed. The use of laminates and composite shielding materials reinforced with graphite and other conducting fibers is included. (Contains 60 citations fully indexed and includes a title list.)

PB82-861311 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electromagnetic Shielding Polymers. 1972-January, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Jan 82.
Jan 82, 79p
Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

Electromagnetic shielding by means of electrically conducting plastics is discussed in the cited reports. Applications include coatings for infrared instrumentation, radar absorbers, composite materials for aircraft construction, laser window materials, and shielding of probes to minimize RF interference on scientific satellites. (Contains 67 citations fully indexed and includes a title list.)

PB82-862145 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Inorganic Polymers. 1970-January, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 82.
Jan 82, 154p
Supersedes PB81-858276.

The synthesis and properties of inorganic polymeric materials are discussed in terms of molecular structure and thermal properties. Most formulations deal with phosphinates and polyphosphazines; however, information on carboranes, siloxanes, and solid rocket fuel formulations is included. (This updated bibliography contains 122 citations, 23 of which are new entries to the previous edition.)

11J. Rubbers

AD-A108 446/6 PC **A03**/MF **A01**
Washington State Univ., Pullman. Dept. of Physics.
Crack Velocity Dependence of Electron Emission During Fracture of Filled Elastomers.
Technical rept.,
J. T. Dickinson, and L. C. Jensen. 15 Nov 81, 27p
Rept no. TR-4
Contract N00014-80-C-0213

We examine the electron emission accompanying the fracture of filled elastomers, which in previous work we have shown to be intense and due predominately to interfacial failure. In this study we show that there is a strong velocity dependence on the rate of electron emission during the propagation of a crack in filled silicon rubber and polybutadiene filled with glass beads. We propose that the concentration of free radicals produced by crack propagation increases rapidly with crack velocity which in turn produces more intense electron emission by a chemi-emission mechanism. (Author)

11K. Solvents, Cleaners, and Abrasives

N82-13253/1 PC **A06**/MF **A01**
Staatliches Forschungsinstitut fuer Geochemie, Bamberg (Germany, F.R.).
Investigations Towards the Understanding of Surface Treatment of Propellant Grains by Means of Trace Elements Untersuchungen Zur Erfassung der Oberflaechenbehandlung von Treibladungspulvern Mittels Markierter Substanzen.
H. Meier, D. Boesche, G. Zeitler, E. Zimmerhackl, and W. Hecker. 1979, 101p BMVG-FBWT-79-14
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

The migration of deterrents into nitrocellulose grains is studied by means of the carbon 14 radiotracer technique. Such deterrents improve the internal ballistic properties of propellants and influence barrel erosion. The distribution of the deterrent compounds was measured by profile sectioning in conjunction with beta scintillation metering. The measurements yield values for diffusion coefficients, activation energies, and frequency factors as well as for scaling laws of the migration behavior with respect to temperature, time and concentration. A model of the migration mechanism, assuming a moving boundary, is established consistent with the available data.

11L. Wood and Paper Products

PAT-APPL-6-294 096 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Enhancement of Color Quality of Lumber during Drying.
Patent Application,
Howard Rosen. Filed 18 Sep 81, 10p PB82-148727
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The main objective of this invention is to provide a method for darkening lumber throughout its thickness without damaging its structural quality. An objective of this invention is to simultaneously dry and darken lumber. Another objective is to reduce the contrast between heartwood and sapwood of walnut lumber.

PB82-145202 PC **A02**/MF **A01**
Norsk Treteknisk Inst., Oslo.
Device for Non-Destructive Testing of Particle Boards (Apparat for Ikke-Oedeleggende Proeving av Sponplater),
Karl Moerkved, Stein Johannsesen, and Egil Ormstad. 1976, 12p MEDDELELSE-54, ISBN-82-7120-012-7
Text in Norwegian, summary in English.

The objective of this study was to find a non-destructive testing method for particle boards suited for quality control in the production. Following a literature survey it was decided to investigate if the development of such a method could be based on the modulus of elasticity of the boards. Laboratory measurements of the modulus of elasticity of whole boards by recording of the deformation caused by a linear load placed in the middle of the board agreed very well with the modulus of elasticity measured on small samples according to standard methods. Further tests also demonstrated a good correlation between modulus of elasticity and bending strength of particle boards. These positive results led to the design of an automatic measuring device. The principle of this device is to measure the self deflection of boards mounted on two supports, give a signal for lowering of a linear load across the board, record the new deflection, and then subtract the first value from the second. Then the instrument will feed the found difference, which is an expression of the deflection caused by the load, to a recorder.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A108 148/8 PC **A02**/MF **A01**
Iowa Univ., Iowa City. Dept. of Statistics.
Remarks Concerning Chase's Results on Testing for Ordered Alternatives.
Technical rept.,
Tim Robertson, and F. T. Wright. 10 Oct 81, 18p
Rept nos. TR-79, 8
Contracts N00014-80-C-0321, N00014-80-C-0322

Chase (Biometrika (1974)) found a good approximation for the chi-bar-square and E-bar-square distributions for an important special case. These distributions are fundamental to the theory of order restricted tests. Chase had in mind the problem of comparing ordered dose levels with a control and considered the case where there are more observations on the control. He obtained a recursive relation for the limiting values of the coefficients in those distributions as the sample size on the control becomes infinite and the other sample sizes remain fixed and equal. His approximation is the result of an interpolation between critical values in this limiting case and critical values in the case where all the sample sizes are equal. Starting with Chase's formula we derive a sharper recursion relation and table the limiting coefficients. This allows one to determine approximate P-values; to use critical values not included in Chase's tables and to apply these approximations to testing problems where other versions of the chi-bar-square and e-bar-square distributions occur.

AD-A108 188/4 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Statistics.
Ranking and Selection in Designed Experiments: Complete Factorial Experiments.
Technical rept.,
Edward J. Dudewicz, and Baldeo K. Taneja. Oct 81, 25p Rept no. TR-210R
Contract N00014-78-C-0543
Supersedes AD-A088 125.

Over the years, while it has been recognized that developments for other designs are of great interest, almost all ranking an selection papers have dealt explicitly only with the completely randomized design. We review what is known in other design settings, then proceed to new results on the complete factorial experimental design. We show that existing procedures are vitiated by interaction in such a design, but give a new procedure which is fully valid even in the presence of unbounded interaction. (Author)

AD-A108 189/2 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Computer-Based Education Research Lab.
Spotting Incorrect Rules in Signed-Number Arithmetic by the Individual Consistency Index.
Research rept.,
Kikumi K. Tatsuoka, and Maurice M. Tatsuoka. Aug 81, 47p Rept no. RR-81-4
Contract N00014-79-C-0752
Errata sheet inserted.

This study demonstrates that even a criterion-referenced test, in which items are chosen from a single content domain, requires a close examination of construct validity. The Individual Consistency Index (ICI) is effective in detecting anomalous response patterns resulting from some misconception(s). The subset obtained by deleting the responses which were spotted by ICI showed a higher unidimensionality. The same result was replicated by another data set whose test was parallel but not identical to the previous one. Although computerized error diagnostic programs can identify misconceptions possessed by a student in very specific domains of arithmetic, ICI can be applicable to more general domains and detect possible candidates to route to the expensive error-diagnostic programs. (Author)

AD-A108 264/3 MF **A01**
University of Southern California, Los Angeles. Dept. of Management and Policy Sciences.
Renewal Tables: Tables of Functions Arising in Renewal Theory.
Technical rept.,
Laurence A. Baxter, Ernest M. Scheuer, Wallace R. Blischke, and Denis J. McConalogue. Sep 81, 339p
Contract N00014-75-C-0733
Availability: Microfiche copies only.

The generalized cubic splining algorithm enables us to evaluate recursively-defined convolutions for a wide variety of distribution functions. The algorithm has been applied to evaluate the renewal function, variance function and the integral of the renewal function for five distributions (gamma, inverse Gaussian, log-normal, truncated normal and Weibull) for a wide range of values of the shape parameter. The results of the

computations are discussed and a comparison is made with previous tabulations. (Author)

AD-A108 279/1 PC **A02**/MF **A01**
Stanford Univ., CA. Inst. for Plasma Research.
Examination of Time Series through Randomly Broken Windows,
P. A. Sturrock, and E. C. Shoub. Jul 81, 24p Rept no. SUIPR-824-R
Contract N00014-75-C-0673, Grant NGL-05-020-272

In order to determine the Fourier transform of a quasi-periodic time series (linear problem), or the power spectrum of a stationary random time series (quadratic problem), it is desirable that data be recorded without interruption over a long time interval. In practice, this may not be possible. The effect of regular interruption such as the day/night cycle is well known. We here investigate the effect of irregular interruption of data collection (the 'breaking' of the window function) with the simplifying assumption that there is a uniform probability p that each interval of length tau, of the total interval of length T = N tau, yields no data. For the linear case we find that the noise-to-signal ratio will have a (one-sigma) value less than epsilon if N exceeds (1/p)(1-p)(1/sq epsilon). For the quadratic case, the same requirement is met by the less restrictive requirement that N exceed (1/p)(1-p)(1/epsilon). It appears that, if four observatories spaced around the earth were to operate for 25 days, each for six hours a day (N = 100), and if the probability of cloud cover at any site on any day is 20% (p = 0.8), the r.m.s. noise-to-signal ratio is 0.25% for frequencies displaced from a sharp strong signal by 15 micro Hz. The noise-to-signal ratio drops off rapidly if the frequency offset exceeds 15 micro Hz. (Author)

AD-A108 331/0 PC **A02**/MF **A01**
Missouri Univ.-Rolla. Dept. of Mathematics.
One-Sided Comparisons for Treatments with a Control.
Technical rept.,
Tim Robertson, and F. T. Wright. 10 Sep 81, 23p
Rept no. TR-78
Contract N00014-80-C-0321
Prepared in cooperation with Missouri Univ., Rolla. Dept. of Mathematics, contract N00014-80-C-0322.

Distribution theory for likelihood ratio statistics for the comparison of several treatments with a control is discussed. These test statistics account for prior information that the treatments are at least as effective as the control. It is assumed that the sample sizes on the treatments are (approximately) equal and the sample size on the control is at least as large. Normal means are compared under the assumption of a common variance, either known or unknown. The analogous problem for proportions is also considered. (Author)

AD-A108 332/8 PC **A03**/MF **A01**
Missouri Univ.-Columbia. Dept. of Statistics.
On Testing Monotone Tendencies.
Technical rept.,
Richard L. Dykstra, and Tim Robertson. 30 Oct 81, 27p Rept no. TR-80
Contract N00014-78-C-0655
Prepared in cooperation with Iowa Univ., Iowa City, contract N00014-80-C-0321.

In certain problems, it may be expected that a regression function has a substantial overall tendency to be monotone and yet we may not be certain that all of the restrictions imposed by a simple order are satisfied. Distribution theory for liklihood ratio tests of homogeneity of a collection of normal means when the collection is 'decreasing on the average' and for testing 'decreasing on the average' as a null hypothesis, is presented. The restriction 'decreasing on the average' is less restrictive than the usual monotone restriction and allows the data to give rise to 'reversals' over short ranges of values of the parameter set. It is closely related to the 'starshaped ordering' restriction.

AD-A108 357/5 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Algorithm for the Inverse of a Hermitian Toepiltz Matrix.
Interim rept.,
Karl Gerlach. 27 Nov 81, 18p Rept no. NRL-8539

New methods for finding the inverse of a hermitian Toepiltz matrix and the related problem of solving a system of linear equations are presented. Efficient algorithmic procedures for these methods are listed. (Author)

AD-A108 368/2 PC **A02**/MF **A01**
Pittsburgh Univ., PA. Inst. for Statistics and Applications.
Optimization of Functions of Matrices with Applications to Statistical Problems.
Interim rept.,
C. Radhakrishna Rao. Oct 81, 20p TR-81-31,
AFOSR-TR-81-0767
Contract F49620-79-C-0161

The paper reviews some methods of optimizing functions of vectors and matrices subject to some restrictions and develops techniques for solving them without using the calculus of matrix derivatives. Their application to a number of statistical problems in linear estimation and multivariate analysis is illustrated. (Author)

AD-A108 370/8 PC **A02**/MF **A01**
Florida Univ., Gainesville. Center for Mathematical System Theory.
Mathematical Techniques for Nonlinear System Theory.
Final rept. 1 Jun 76-31 May 81,
R. E. Kalman. Sep 81, 15p AFOSR-TR-81-0755
Grant AFOSR-76-3034

This report deals with research results obtained in the following areas: (1) Finite-dimensional linear system theory by algebraic methods--linear systems over a ring, algebraic methods in the study of feedback, polynomial methods for the study of linear systems, F mod G invariant subspaces; (2) Infinite-dimensional linear systems--realization theory of infinite-dimensional linear systems; (3) Nonlinear system theory--basic properties of polynomial (discrete-time) systems and their realization theory; and (4) Identification problems in economics--study of econometric model building.

AD-A108 373/2 PC **A02**/MF **A01**
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Numerical Methods for Stiff Differential Equations, and Josephson Interferometer Equations.
Annual technical rept. 1 Jul 80-30 Jun 81,
W. Liniger, and F. Odeh. 14 Aug 81, 15p AFOSR-TR-81-0768
Contract F49620-77-C-0088

Results for stiff differential equation include: (1) For all k > or = 1, the (k-1)-parameter family of all A-contractive k-step formulas of order of accuracy p = 2 was derived for variable steps. A-contractive one-leg methods are guaranteed to be stable for the variable coefficient test problem x(dot)=lambda(t)x with any lambda(t), Re lambda(t) < or = 0, and arbitrary step sequences; (2) A stability theorem was proved for A sub 0-contractive one-leg methods applied to diagonally dominant (but not necessarily monotone) nonlinear systems; (3) A procedure was devised for selecting an A-contractive two-step method at every step of the integration in such a way as to minimize a global error bound; and (4) It was shown that the sets of all A-stable and A-contractive formulas with p = k = 2 can be identified by a local analysis in the transfer or time domain pertaining to slowly varying oscillatory solutions. Results on Josephson equations include: (1) The response of an extended junction to a time-dependent quasi-periodic voltage source was studied analytically. The existence and uniqueness of a quasi-periodic solution was established in the presence of dissipation and for small non-linearities; (2) The numerical procedure for studying the response of the two-junction interferometer was modified to increase its accuracy and efficiency. Standard bifurcation of the solution branch, as well as period-doubling bifurcation were found, causing the I-V curves to be multi-valued and hysteretic.

AD-A108 414/4 Not available NTIS
California Univ., Los Angeles.
Determining Solutions of Hyperbolic Systems from Incomplete Data,
Kenneth P. Bube. Sep 80, 32p
Contract N00014-75-C-1132, Grant NSF-MCS76-07039
Sponsored in part by Grants NSG-5034 and NSG-5130.
Availability: Pub. in Communications on Pure and Applied Mathematics, v34 p799-830 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A108 492/0 PC **A03**/MF **A01**
Maryland Univ., College Park. Inst. for Physical Science and Technology.
A Quantitative Evaluation of the Feasibility of, and Suitable Hardware Architectures for, an Adaptive, Parallel Finite-Element System.
Technical note,
Pamela Zave, and George E. Cole, Jr. Sep 81, 46p
Rept no. BN-971
Contract N00014-77-C-0623

This paper describes an experimental implementation of a design for an adaptive, parallel finite-element system. The implementation was used to simulate the performance of this design on several microprocessor-based multiprocessor architectures. We conclude that it will be possible to build hardware/software finite-element systems which exploit data segmentation to achieve flexibility, modularity, and the ability to process very large problems. (Author)

AD-A108 523/2 PC **A05**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Ship Performance Dept.
Modifications to Computer Program for Parameter Estimation for the Generalized Gamma Distribution,
Michel K. Ochi. May 77, 97p Rept no. DTNSRDC/SPD-772-01

An extensive study of an existing digital computer program for determining parameters required to represent SES-100B trials data by a generalized gamma function is carried out. The purpose of the study is to resolve the difficulties encountered in earlier studies. In these earlier studies, approximately 5 percent of the cases analyzed produced unrealistic values for the distribution parameters. In order to resolve this problem, data sensitivity studies are carried out. Based on results of the study, criteria are developed for determining cases that should not be processed. Three other techniques besides the Stacy-Mihram method are investigated. The most successful alternative method is the maximum likelihood method, which is incorporated into the new digital computer program. A program listing and an example of the generated output are included in this report. (Author)

AD-A108 603/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
Research in Algebraic Manipulation.
Final rept. 1980-1981,
Joel Moses. Sep 81, 4p AFOSR-TR-81-0797
Grant AFOSR-80-0250

Research in the past year has concentrated on algorithms for the integration of algebraic functions, these algorithms are being developed.

AD-A108 631/3 PC **A03**/MF **A01**
California Univ., San Diego, La Jolla. Dept. of Mathematics.
Smoothing Splines: Regression, Derivatives and Deconvolution.
Research rept.,
John Rice, and Murray Rosenblatt. Nov 81, 41p
Contract N00014-81-K-0003, Grant NSF-MCS79-01800

The statistical properties of a cubic smoothing spline and its derivative are analyzed. It is shown that unless unnatural boundary conditions hold, the integrated squared bias is dominated by local effects near the boundary. Similar effects are shown to occur in the regularized solution of a translation-kernel integral equation. These results are derived by developing a Fourier representation for a smoothing spline. (Author)

AD-A108 653/7 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Statistics.
Optimization in Statistics - An Introduction.
Technical rept.,
Jagdish S. Rustagi. Oct 81, 21p Rept nos. TR-249, 9
Contract N00014-78-C-0543

Optimization techniques play an important role in various areas of statistics. Examples from Estimation, nonparametric statistics, design of experiments, sample surveys, multivariate statistical inference, information theory and regression analysis are provided. (Author)

AD-A108 746/9 PC **A04**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Statistics.

The Computation of Laplacian Smoothing Splines with Examples.
Technical rept.,
James G. Wendelberger. Sep 81, 68p Rept no. TR-648
Contract N00014-77-C-0675, Grant NAG5-128

Laplacian Smoothing Splines (LSS) are presented as generalizations of graduation, cubic and thin plate splines. The method of generalized cross validation (GCV) to choose the smoothing parameter is described. GCV is used in the algorithm for the computation of LSS'S. An outline of a computer program which implements this algorithm is presented along with a description of the use of the program. Examples in one, two and three dimensions demonstrate how to obtain estimates of function values with confidence intervals and estimates of first and second derivatives. Probability plots are used as a diagnostic tool to check for model inadequacy. (Author)

N82-13798/5 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
A Sharper Estimate of the Renewal Function.
H. Carlsson. 1980, 11p CTH-MATH-1980-18

Remainder term estimates of the renewal function of a strongly non-lattice measure with finite moments of order alpha or equal to 2 are considered. The estimates are obtained by Fourier methods and improve on previous results. As steps in deriving the estimates, an expression for U(x) equal to o(x exp(-alpha)), as mod x approaches infinity, alpha or equal to 2, is proved, and an expression for alpha or equal to 3 is derived. These two lemmas are used to prove and simplify the estimates in the cases of alpha or equal to 2 and alpha or equal to 3.

N82-13799/3 PC **A03**/MF **A01**
Mathematisch Centrum, Amsterdam (Netherlands).
Proving Total Correctness of Nondeterministic Programs in Infinitary Logic.
R. J. R. Back. Oct 80, 32p MC-IW-150/80
Submitted for Publication.

The formalization in infinitary logic of the weakest precondition approach to prove total correctness of nondeterministic programs was shown. The technique is extended to hierarchically structured programs by adding a primitive statement for operational abstraction, the nondeterministic assignment statement, to the guarded commands of Dijkstra. The infinitary logic is strong enough to express the weakest preconditions for Dijkstra's guarded commands, but too weak for the extended guarded commands. Two possible solutions are considered: (1) going to an essentially stronger infinitary logic, and (2) restricting the power of the nondeterministic assignment statement such that the nondeterministic choice is always made from a finite set of alternatives.

N82-13800/9 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
High Order Approximations to Eigensolutions of Sturm-Liouville Problems by Deferred Corrections.
B. Lindberg. 1981, 14p TRITA-NA-8104
Sponsored in Part by Bielefield Univ.

Sturm-Liouville eigenvalue problems for ordinary differential equations are discretized with second order accurate formulas. Increasingly accurate approximations are computed by solving a sequence of perturbed problems, where each problem can be efficiently solved by a technique similar to inverse iteration. The perturbations are computed by compact deferred correction formulas.

N82-13801/7 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
Pointwise Error Estimation for Finite Element Discretizations, Part 1.
B. Lindberg. 1981, 17p TRITA-NA-8105-PT-1

A technique for solving boundary value problems for ordinary differential equations is examined. Ideas are also applicable to partial differential equations. The error estimation algorithm is derived by heuristic arguments based on experience with finite difference discretizations of operator equations. Error estimates are correct to at least two significant digits.

N82-13802/5 PC **A05**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
Steenrod Operations in Spectral Cohomology Theories.
Ph.D. Thesis - Illinois Univ.
T. Weibull. 1981, 95p CTH-MATH-1981-06

Certain properties of Eilenberg-Maclane spectra that allow definition of Steenrod operations are abstracted, and the notion of a Gamma (a)-spectrum is arrived at. This is a ring spectrum E, whose characteristics are given. An expression defining operations is derived which gives cohomology operations if E is an Omega-spectrum. The process for achieving stability and definability for non Omega-spectra is shown. Internal operations using slant product with sequences of defined elements are given and the case for considering finite coefficients presented. Examples of Gamma (a)-spectra are formulated. The dependence of stable internal slant product operations on the E-cohomological structure of the group is discussed. As a comment on the relationship between the slant product and the Kuenneth formula approach to internal operations, a natural homomorphism from the Ext to the Tor Kuenneth formula in ordinary cohomology is offered.

N82-13803/3 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
On General 1 exp p Summability Methods.
B. Johansson. 1981, 17p CTH-MATH-1981-07

The best possible conditions for a rapidly decreasing function to fulfill certain relationships, with a specified discrete tempered distribution where the mass points are well separated, are derived, using Jensen's inequality. Two lemmas necessary for the proof of the theorem are shown, in the first case using the Poisson's summation formula and the Fourier transform of a tempered distribution, and in the second deriving an expression for the existence of a particular function of a sequence of real numbers satisfying predetermined conditions.

PB82-145954 PC **A03**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Signal Flow Graph Reduction of Sampled Data-Systems,
Sohrab Salehi. Oct 79, 30p CONTROL SYSTEMS CENTRE-464

A simple new algorithm is presented for the calculation of the transmittance between any two points in a composite sampled-data system. It is based on a systematic node-by-node reduction of a specially defined signal flow graph. Nowadays increasingly larger systems are being investigated and digital controllers are more likely to be employed, so this algorithm will aid the study and design of large composite sampled-data systems.

PB82-145962 PC **A03**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Hierarchical Successive Approximation Algorithms for Non-Linear Systems: Part I. Generalisation of the Method of Takahara,
M. F. Hassan, and M. G. Singh. Nov 79, 28p
CONTROL SYSTEMS CENTRE-465
See also Part 2, PB82-145970. Prepared in cooperation with Cairo Univ., Giza (Cairo). Dept. of Electronics and Communications.

In this two part paper, the authors examine hierarchical approaches to the solution of non-linear dynamic optimization problems for large scale systems. The algorithms are seen, within a unified framework, to be a part of the general technique of successive approximations. A unification is also provided for the convergence results. The approaches are compared to each other and to the standard quasilinearization method from the point of view of numerical requirements.

PB82-145970 PC **A03**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Hierarchical Successive Approximation Algorithms for Non-Linear Systems: Part II. Algorithms Based on Costate Coordination,
M. F. Hassan, and M. G. Singh. Nov 79, 26p
CONTROL SYSTEMS CENTRE-466
See also Part 1, PB82-145962. Prepared in cooperation with Cairo Univ., Giza (Egypt). Dept. of Electronics and Communications.

In this second part of the paper, algorithms based on costate coordination are examined. Both two level and three level algorithms are considered. They are again seen to be within the class of successive approximation techniques. A unification is also provided of the convergence results. A number of numerical examples are also treated to provide comparisons of numerical properties.

PB82-145988 PC **A03**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
The Use of Model Following Methods to Simplify Linear Systems,
P. A. Cook, and M. M. M. Hassan. Oct 79, 44p
CONTROL SYSTEMS CENTRE-468

This report presents a method of reducing the order of a linear dynamical system model by retaining a subset of the original state variables and minimizing a performance index which gives a measure of the difference between the original and the reduced model responses. Particular attention is given to the choice of states to be retained in the reduced model, and the results are illustrated by application to three practical examples.

PB82-145996 PC **A02**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Output Feedback Control of Systems with Slow and Fast Modes,
P. Chemouil, and A. M. Wahdan. Dec 79, 19p
CONTROL SYSTEMS CENTRE-469
Prepared in cooperation with Ain Shams Univ., Cairo (Egypt).

This paper is concerned with the output feedback control of a class of singularly perturbed systems. It is shown that the output feedback control in (n + m) th-order plants can be reduced to the separate design of output feedback control laws for plants of mth and nth orders, respectively. The algorithm proposed is illustrated by designing an output feedback control using parametric optimization for a 14th order plant.

PB82-146010 PC **A02**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Matched Pseudo-Noise Signals,
P. E. Wellstead. Oct 78, 10p CONTROL SYSTEMS CENTRE-475.

This note is intended to remove confusion which has arisen in the literature concerning the use of periodic pseudo-noise sequences in conjunction with the radix-2 Fast Fourier Transform (FFT). In particular, the fundamental point is made that for an effective union of periodic test signals and the FFT, there should be an exact correspondence between the spectral lines contributed by the test signal and the spectral lines detected by the FFT. An existing algorithm for ensuring this correspondence is indicated for the so-called PRBS pseudo-noise signal. The exact coincidence of spectral lines, although desirable, is not always needed. In certain cases, 'almost' coincident lines are acceptable. The FFT then detects a fraction of the energy associated with each line after filtering by the Fourier data window.

PB82-146028 PC **A04**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
The Simplification of Linear Discrete-Time Systems by Model Following Methods,
M. M. M. Hassan, and P. A. Cook. Mar 80, 52p
CONTROL SYSTEMS CENTRE-476

A method of model reduction, previously given by the authors for continuous time systems, is extended to the discrete case. The results are applied to two practical examples, and the effects of varying the sampling interval is investigated. A comparison is made with other methods, which are based on the retention of dominant modes.

PB82-146085 PC **A02**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.

Approximate Feedback Design of Singularly Perturbed Systems,
Magdi S. Mahmoud, Mohammed F. Hassan, and Madan G. Singh. Jun 80, 22p CONTROL SYSTEMS CENTRE-483
Prepared in cooperation with Cairo Univ., Giza (Egypt). Dept. of Electronics and Communications.

Approximate feedback design for linear regulators possessing a three-time scales property is developed. Two perturbation parameters are introduced in particular to account for the degree of smallness and extent of largeness of two boundary modes with respect to the normal mode of operation. Suitable approximation is employed in order to separate the overall design effort into three different regions. A suboptimality index of the approximate closed-loop system is derived. The computational procedure for design implementation is illustrated on power system examples.

PB82-146119 PC **A03**/MF **A01**
Indian Inst. of Tropical Meteorology, Poona.
On Accelerating the FFT of Cooley and Tukey,
S. K. Mishra. Feb 81, 30p R-028

The efficient Fourier transform (EFT), and the Fast Fourier Transform (FFT) algorithms are described, and their computational efficiencies with respect to the direct method are discussed. An efficient procedure is proposed for the reordering of data set; the use of EFT algorithm for the initial Fourier transforms and restricting the size of final subsets to not less than 4 are also suggested for saving computation time in the FFT. It is found that on average the FFT with the proposed modifications is more than twice as fast as the original FFT. The amount of overhead operations involved in computer routine, based on the modified FFT, is estimated.

SAND-79-2444 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Type-Insensitive ODE Codes Based on Implicit A-Stable Formulas.
L. F. Shampine. Sep 80, 29p
Contract AC04-76DP00789

A special concept of stiffness is appropriate for implicit A-stable formulas. It is possible to recognize this kind of stiffness economically and reliably by use of information readily available during the integration of an ODE. Using this development, a variety of effective ODE solvers could be made insensitive to the type of problem, i.e. the code would automatically recognize and alter automatically its algorithm at any step depending on whether the problem is stiff there. (ERA citation 05:039211)

UCID-18185 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
LCPT: A Program for Finding Linear Canonical Transformations.
B. W. Char, and B. McNamara. 21 May 79, 31p
Contract W-7405-ENG-48

This article describes a MACSYMA program to compute symbolically a canonical linear transformation between coordinate systems. The difficulties in implementation of this canonical small physics problem are also discussed, along with the implications that may be drawn from such difficulties about widespread MACSYMA usage by the community of computational/theoretical physicists. (ERA citation 05:003861)

UCID-18825 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
New Formulation of Backward Differenced Linear Multistep Methods for Ordinary Differential Equations.
A. M. Winslow. 2 Oct 80, 8p
Contract W-7405-ENG-48

The ordinary differential equation dy/dt = f(y,t) is to be integrated numerically by a k/sup th/-order linear multistep method. Backward differencing is chosen for application to stiff equations. The novel feature of the formulation is the manner in which the history array is stored. The method has been applied to the numerical solution of systems of chemical kinetics equations. (ERA citation 06:005635)

12B. Operations Research

AD-A108 229/6 PC **A03**/MF **A01**
George Washington Univ., Washington, DC. Inst for Management Science and Engineering.
Computable Optimal Value Bounds and Solution Vector Estimates for General Parametric NLP Programs.
Scientific rept.,
Anthony V. Fiacco. Aug 81, 38p Rept no. SERIAL-T-451
Contract N00014-75-C-0729, Grant NSF-ENG79-06104

A simple technique is proposed for calculating piecewise-linear continuous global upper and lower parametric bounds on the optimal value of nonlinear parametric programs that have a convex or concave optimal value function. This provides a procedure for calculating parametric optimal value bounds for general nonconvex parametric programs, whenever convex or concave underestimating or overestimating problems can be constructed. For the jointly convex program, this approach leads immediately to the construction of a parametric feasible vector yielding a computable and generally sharper nonlinear optimal value upper parametric bound. Connections and extensions of well-known duality results are developed that lead to constructive interpretations of the bounds results and generally sharper nonlinear parametric lower bounds. (Author)

13.

MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A108 254/4 PC **A03**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Performance Analysis of Vapour Cycle Cooling Systems,
Brian Rebbechi, John L. Fowler, Neil J. Repacholi, and Gordon L. Collins. Mar 81, 50p Rept no. ARL/MECH-ENG-NOTE-386

The performance of several different configurations of vapour cycle cooling systems, using automotive-type components, has been experimentally determined. Performance of the individual components has also been analysed and presented in a form appropriate for assessing the suitability of their application to other system types. (Author)

AD-A108 333/6 PC **A03**/MF **A01**
Hughes Aircraft Co., Fullerton, CA. Ground Systems Group.
Development of Heat Pipe Module for Power Semiconductor Cooling.
Final rept. Sep 79-Nov 81,
G. J. Bastien, and K. S. Sekhon. Nov 80, 41p Rept no. HAC-FR-80-12-1494
Contract DAAK70-79-C-0127

Application of heat pipe technology to cooling problems is an efficient means to reduce hot spot temperatures; overall thermal conductance is significantly improved as compared to conduction through a solid. This effort was focussed on the design and development of a heat pipe module which could be used to retrofit an efficient cooling system to an existing Integrated Power Switch (IPS) module. The design selected maximized the thermal performance of the heat exchange system by eliminating a dielectric barrier between the IPS power strip and the heat sink. This necessitated the use of isolation between the two power strips of the IPS to maintain normal circuit insertion capability; the overall package was also electrically insulated. At constant air flow pressure drop (different flow rates) the heat pipe module provided a reduction in component temperature rise by about a factor of three (3) at equal input power, or could handle approximately three (3) times the power of the conventional IPS thermal system for equivalent temperature rise. Measured thermal resistances of .17 and .51 C/watt were obtained for the heat pipe heat exchange system and the original IPS conduction heat sink, respectively, at a pressure drop of 0.60 inches of water. (Author)

AD-A108 335/1 PC **A04**/MF **A01**
NUS Corp., Rockville, MD.
Review of 'Vapormid' Catalytic Vapor Device.
Final rept.,
Paul M. Utterback. Sep 81, 70p USAFESA-T-2107
Contract DACA31-80-D-0019

A literature search and review of existing test data was performed with the objective of evaluating the performance of a device sold under the trade name 'Vapormid'. The manufacturer of the device claims that when properly installed on the combustion air system of a gas or oil burner it can result in energy savings of up to 30%, as well as reduced sooting of heat transfer surfaces and reduced emissions. A review of eight test programs performed by independent organizations over the period of 1975 to 1980 yielded insufficient evidence to support these claims. Where an improvement in efficiency was noted, the reports tended to indicate that it was derived from fine tuning and adjustments performed on the burner system and not from the addition of the Vapormid. (Author)

AD-A108 382/3 PC **A06**/MF **A01**
New Mexico State Univ., Las Cruces.
Design Calculation Procedure for Passive Solar Houses at Navy Installations in Regions with Cold Climate. Volume I.
Preliminary rept. Apr 80-Sep 81,
Monika Lumsdaine, and Edward Lumsdaine. Oct 81, 123p CEL-CR-82.002
Contract N62583-79-MR-585
See also Volume 2, AD-A108 383.

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in regions with cold climate.

AD-A108 383/1 PC **A06**/MF **A01**
New Mexico State Univ., Las Cruces.
Design Calculation Procedure for Passive Solar Houses at Navy Installations in East Coast Regions with Temperate Climate. Volume II.
Preliminary rept. Apr 80-Sep 81,
Monika Lumsdaine, and Edward Lumsdaine. Oct 81, 117p CEL-CR-82.003
Contract N62583-79-MR-585
See also Volume 3, AD-A108 384.

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in East Coast regions with temperate climate.

AD-A108 384/9 PC **A07**/MF **A01**
New Mexico State Univ., Las Cruces.
Design Calculation Procedure for Passive Solar Houses at Navy Installations in Regions with Warm, Humid Climate. Volume III.
Preliminary rept. Apr 80-Sep 81,

Monika Lumsdaine, and Edward Lumsdaine. Oct 81, 132p CEL-CR-82.004
Contract N62583-79-MR-585
See also Volume 4, AD-A108 385.

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. the reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in regions with warm, humid climate.

AD-A108 385/6 PC **A06**/MF **A01**
New Mexico State Univ., Las Cruces.
Design Calculation Procedure for Passive Solar Houses at Navy Installations in the Pacific Northwest. Volume IV.
Preliminary rept. Apr 80-Sep 81,
Monika Lumsdaine, and Edward Lumsdaine. Oct 81, 120p CEL-CR-82.005
Contract N62583-79-MR-585
See also Volume 5, AD-A108 386.

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in the Pacific Northwest.

AD-A108 386/4 PC **A06**/MF **A01**
New Mexico State Univ., Las Cruces.
Design Calculation Procedure for Passive Solar Houses at Navy Installations in Warm California Climates. Volume V.
Preliminary rept. Apr 80-Sep 81,
Monika Lumsdaine, and Edward Lumsdaine. Oct 81, 121p CEL-CR-82.006
Contract N62583-79-MR-585
See also Volume 1, AD-A108 382.

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, build R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in warm California climates.

ORNL/TM-6830/P4 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
District Heating/Cogeneration Application Studies for the Minneapolis-St. Paul Area: Methods and Cost Estimates for Converting Existing Buildings to Hot-Water District Heating.
R. E. Sundberg, and H. O. Nyman. Dec 79, 151p
Contract W-7405-ENG-26

This report presents the results of a study of the costs and techniques required to convert existing buildings in Minneapolis and St. Paul to use 150 exp 0 C (300 exp 0 F) hot-water district heating. The buildings and heating systems in the high-density areas in both downtown Minneapolis and St. Paul were surveyed, and a computer data base was assembled. A total of 280 buildings were surveyed, representing a peak thermal load of about 400 MW. The return-water temperature was selected for minimum cost and maximum power yield at the cogeneration plant. The cost of converting heating systems in existing buildings to district heating was determined by two separate approaches: theoretical cost studies of heating systems and engineering cost studies of heating systems in existing buildings. In the first approach, cost estimates were generated by designing conversion systems for a range of building sizes for each of the major types of heating systems. In the second approach, engineering cost studies were done for five buildings that were representative of the buildings in the study area. The heating-system conversions of the five buildings were designed for three return-water temperatures to determine the effect on conversion costs of varying the water flow rate and the difference between the supply-water temperature and return-water temperature. The conversion costs for the three return-water temperatures can be used to estimate the optimum return-water temperature. Conversion costs were determined from detailed bids submitted by a heating, ventilating, and air conditioning contractor. (ERA citation 05:016098)

ORNL/TM-7578 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Evaluation of Tubular Ceramic Heat-Exchanger Materials in Residual-Oil-Combustion Environment.
G. C. Wei, and V. J. Tennery. Mar 81, 167p

Fourteen different structural ceramic tubes were exposed to a residual oil combustion environment at 1200 exp 0 C for 500 h with a total of six thermal cycles. Silicon carbide and alumina ceramics survived the exposure. Best candidates for heat exchanger use in residual oil combustion environments include siliconized silicon carbide, pressureless sintered silicon carbide, and high-purity alumina. Cordierite, mullite, and zirconia-mullite cracked extensively. Molten nodules or deposits of cristobalite, tridymite, and silicate glass containing fuel oil impurities such as Na, Al, Ca, V, Fe, and Ni formed on the upstream side of the SiC-based specimens. Active oxidation proceeds with the release of CO and CO sub 2 at the interface of the nodules or deposits formed on the SiC. Fuel oil impurities including Fe and Ni reacted with the free Si in siliconzed SiC to form low-melting alloys. Surface roughness and grain growth were observed in pressureless sintered SiC as a result of reactions. Microcracks were observed in chemically vapor deposited (CVD) SiC and CVD SiC on SiC. A thin layer of iron-nickel aluminate formed on the outer surfaces of aluminum oxide tubes. Significant grain growth was observed in the upstream side of the high-purity alumina tubes. The test exposure increased helium permeability of siliconized SiC, pressureless sintered SiC, high-purity alumina, and CVD SiC, but it decreased the air permeability of relatively permeable, porous materials. The room temperature C-ring fracture strength of pressureless sintered SiC and high-purity alumina decreased significantly during the exposure but that of siliconized SiC increased slightly. The thermal expansion of pressureless sintered SiC increased while the thermal expansion of siliconized SiC and high-purity alumina remained constant. (ERA citation 06:015782)

PATENT-4 277 819 Not available NTIS
Department of the Army, Washington, DC.
Blackout Lighting for Vehicles.
Patent,
Valentine M. Sobota, and Marshall Vinson. Filed 3 Jul 79, patented 7 Jul 81, 4p AD-D009 022/5, PAT-APPL-6-054 721
Supersedes PAT-APPL-6-054 721.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Four red light emitting diodes are embedded in a synthetic resin encapsulant. Two diodes in each of two pairs are connected in parallel and the two pairs are connected in series with a resistance, a blocking diode, and an on-off switch. A fifth diode which emits yellow light when energized is connected in series with a resistance, a blocking diode, and a brake-actuated switch. (Author)

PB82-135260 CP **T05**
National Bureau of Standards, Washington, DC.
FEDSOL: Economic Optimization Guide for Solar Federal Buildings Projects.
Model-Simulation,
Jeanne W. Powell, Richard C. Rodgers, Jr., and Kimberly A. Barnes. 1981, mag tape NBS/DF-81/007
Source tape is in ASCII character set. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions.

The FEDSOL program determines the economically optimal size of a solar energy system for a user-specified building, location, system type, and set of economic conditions; it conducts numerous breakeven and sensitivity analyses; and it calculates measures of economic performance as required under the Federal Rules. The economic model in the program is linked with the SLR (Solar Load Ratio) design method developed at Los Alamos National Laboratory to predict the performance of active systems. The economics portion of the program can, however, be used apart from the SLR method, with performance data provided by the user. An environmental data file for 243 U.S. cities is included in the program. Highly user oriented, the FEDSOL program is intended as a design and sizing tool for use by architects, engineers, and facilities managers in developing plans for Federal solar energy projects...Software Description: The program is written in the BASIC programming language for implementation on a CYBER 170/720 computer using the NOS Level 531 operating system. 47K bytes of core storage are required to operate the model.

PB82-135823 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Solar Radiation and Illumination.
Final rept.,
S. Treado, and T. Kusuda. Nov 81, 35p NBS-TN-1148
Prepared in cooperation with Naval Facilities Engineering Command, Washington, DC; Department of the Air Force, Washington, DC; Department of the Army, Washington, DC and Department of Energy, Washington, DC. Office of Building and Community Systems.

Experimental data were collected and analyzed under various cloud cover conditions to establish the relationship between solar irradiance and illuminance. Empirically derived equations are presented for estimating diffuse and total illuminance as a function of total and diffuse solar radiation.

PB82-138744 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Analysis of Data from the Energy Monitoring and Control System at the Norris Cotton Federal Office Building.
Nov 81, 98p NBSIR-81-2358
Sponsored in part by Department of Energy, Washington, DC.

The Norris Cotton Federal Office Building (NCFOB) in Manchester, New Hampshire, is a medium-size office building, occupied in September 1976, designed to serve as a demonstration and a feasibility test for energy-conserving building features. A building energy monitoring and control system was operated as a data acquisition system over a 13-month period ending in September 1980. Experience encountered during the checkout and operation of the system is discussed. Results from data reduction procedures used to calculate approximately 160 parameters describing the energy performance of the building are presented on a monthly basis. Hourly data are also presented for daily building operation profiles, building envelope performance, and performance of the mechanical systems.

PB82-139361 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
NBS/ESDS - A Computer Model for the Simulation of Hot Water Systems,
C. A. Wan. Sep 81, 65p NBSIR-81-2303

A computer model, entitled NBS/ESDS, has been developed using a finite difference method to simulate the generation, storage and distribution of a hot water system commonly found in many residences, commercial facilities or industrial facilities. The conduction heat equation which governs the heat transfer in the water heater during all modes of operation, and the heat transfer in the distribution pipe network during its cool-down periods, is solved. A solution is also obtained for the pipe flow equation which governs the heat transfer in the distribution pipe network during the draw periods. Thermal stratification of water is modeled. A plug flow model is used to simulate the draw of heated water from the water heater. A parametric study is also conducted on a given hot water system for a given draw schedule during a 24-hour period. The effects studied include insulating the hot water heater, insulating the distribution pipe, and incorporating a heat trap. Effects of concentrating the distributed draws to two short periods of time of the day on the hot water delivery and the heat loss with the same energy consumption are also studied.

PB82-143611 PC **A06**/MF **A01**
Institut Francais du Petrole, Rueil-Malmaison (France).
Heat Pump Operating with a Mixture of Fluids.
Final rept.,
A. Rojey, C. Meyer, B. Choffe, J. Jacq, and L. Asselineau. 1980, 120p
Trans. of unidentified French mono. See also French report EUR-6848-FR.

The coefficient of performance of a heat pump system comprising an external heat exchange medium may be increased if a non-azeotropic mixture of hydrocarbons or freons as working fluid is used so that it vaporizes or condenses with a change in temperature of the external fluid, i.e., the heat exchange medium. The aim of the research project was the selection of suitable mixtures and the investigation of their properties, the study of the operation of a heat pump using such mixtures by means of a mathematical model and experimental tests, as well as by a technico-economic analysis of actual applications in domestic heating systems and in the industrial sector.

PB82-149543 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
Development and Demonstration of Improved Gas to Gas Heat Pipe Heat Exchangers for the Recovery of Residual Heat.
Final rept.,
M. J. Davies, and G. H. Chaffey. c1981, 52p EUR-7127-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

A new form of heat exchanger has been developed with the following characteristics: (1) compact modular construction: the modules are built up to provide the final exchanger face area as required by the available exhaust gas stream; (2) the above construction allows in situ dismantling of the heat exchanger for cleaning in case of internal fouling; (3) in order that modular construction could be maintained and the chosen corrugated gas side surfaces attached cheaply, a rectangular internally grooved heat pipe or thermosiphon was developed; (4) demonstrations in UK industry are currently taking place which are being independently monitored. It is anticipated that an exploitation and manufacturing licensee can be appointed in 1981.

PB82-861022 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
District Heating: Economic Analysis. 1976-January, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Jan 82.
Jan 82, 106p
Supersedes PB81-857138.Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography covers economic analyses of techniques and technology for district heating for industrial and residential consumption. Various types of thermal power plants for hot water and space heating are considered, along with feasibility studies and comparative evaluations for district heating in general, and for specific geographic locations in particular. Coverage is worldwide. (This updated bibliography contains 90 citations, 28 of which are new entries to the previous edition.)

SAN-1470-T2(App.D) PC **A07**/MF **A01**
Dynatrend, Inc., Arlington, VA.
Development of a Risk Analysis Model. Appendix D. Gas-Fired Heat Pump Case Study, Final Report, October 1979.
Oct 79, 146p
Contract EC-77-C-03-1470

Confronted by major uncertainties in energy supply, demand, and cost, technology suppliers must attempt to make rational manufacturing decisions regarding new energy technologies, technology end-users must attempt to make rational purchasing decisions regarding them, and the DOE Office of Buildings and Community Systems (BCS) must attempt to make rational decisions regarding the type and amount of support it will provide for the development and commercialization of the technologies. One new product development which contains the potential for significant energy savings on a nationwide basis is the gas-fired heat pump. Factors affecting the gas-fired heat pump commercialization decision and the likely results of any action that can be taken to foster that commercialization process are presented. An analysis of the uncertainty associated with basic parameters required for evaluating a venture from the perspective of a manufacturer, such as price, market share, number of units sold, cost of sales, etc. is given. The output from the analysis provides the decision maker with a quantified probabilistic description of the financial outcome (risk vs. return) of the venture in terms of profit, cash flow, net present value, return on investment, etc. (ERA citation 05:029223)

SAN-1743-3 PC **A13**/MF **A01**
Puna Sugar Co., Honolulu, HI.
Engineering and Economic Analysis for the Utilization of Geothermal Fluids in a Cane Sugar Processing Plant. Final Report.
J. T. Humme, M. T. Tanaka, M. H. Yokota, and A. S. Furumoto. Jul 79, 283p
Contract ET-78-C-03-1743

The purpose of this study was to determine the feasibility of geothermal resource utilization at the Puna Sugar Company cane sugar processing plant, located in Keaau, Hawaii. A proposed well site area was selected based on data from surface exploratory surveys. The liquid dominated well flow enters a binary thermal arrangement, which results in an acceptable quality steam for process use. Hydrogen sulfide in the well gases is incinerated, leaving sulfur dioxide in the waste gases. The sulfur dioxide in turn is recovered and used in the cane juice processing at the sugar factory. The clean geothermal steam from the binary system can be used directly for process requirements. It replaces steam generated by the firing of the waste fibrous product from cane sugar processing. The waste product, called bagasse, has a number of alternative uses, but an evaluation clearly indicated it should continue to be employed for steam generation. This steam, no longer required for process demands, can be directed to increased electric power generation. Revenues gained by the sale of this power to the utility, in addition to other savings developed through the utilization of geothermal energy, can offset the costs associated with hydrothermal utilization. (ERA citation 05:011807)

SAND-78-1927 PC **A12**/MF **A01**
Department of Energy, Washington, DC. Office of Conservation and Solar Applications.
Systems Simulation and Economic Analysis for Solar Heating and Cooling.
1978, 258p CONF-780639-
Contract EY-76-C-04-0789
Analysis for solar heating and cooling, San Diego, CA, USA, 27 Jun 1978.

A separate abstract was prepared for each of the approximately 65 included papers; eight are included in EAPA. (ERA citation 05:002800)

SAND-79-2313 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Versatile Microcomputer-Based Temperature Controller.
V. R. Yarberry. Sep 80, 51p
Contract AC04-76DP00789

The wide range of thermal responses required in laboratory and scientific equipment requires a temperature controller with a great deal of flexibility. While a number of analog temperature controllers are commercially available, they have certain limitations, such as inflexible parameter control or insufficient precision. Most lack digital interface capabilities--a necessity when the temperature controller is part of a computer-controlled automatic data acquisition system. We have developed an extremely versatile microcomputer-based temperature controller to fulfill this need in a variety of equipment. The control algorithm used allows optimal tailoring of parameters to control overshoot, response time, and accuracy. This microcomputer-based temperature controller can be used as a standalone instrument (with a teletype used to enter parameters), or it can be integrated into a data acquisition system (with a computer used to pass parameters by way of an IEE-488 instrumentation bus). (ERA citation 05:038630)

SERI/RR-721-377 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Statistical Problems in Design Technique Validation.
J. S. Cohen. Apr 80, 36p
Contract AC02-77CH00178

This work is concerned with the statistical validation process for measuring the accuracy of design techniques for solar energy systems. This includes a discussion of the statistical variability inherent in the design and measurement processes and the way in which this variability can dictate the choice of experimental design, choice of data, accuracy of the results, and choice of questions that can be reliably answered in such a study. The approach here is primarily concerned with design procedure validation in the context of the realistic process of system desig, where the discrepancy between measured and predicted results is due to limitations in the mathematical models employed by the procedures and the inaccuracies of input data. A set of guidelines for successful validation methodologies is discussed, and a simplified validation methodology for domestic hot water heaters is presented. (ERA citation 05:032005)

SERI/TP-351-549 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Comparative Analysis of Six Generic Solar Domestic Hot Water Systems.
R. Farrington, D. Noreen, and L. M. Murphy. Jan 80, 8p CONF-800101-13
Contract EG-77-C-01-4042
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

Results were analyzed from experiments on six solar domestic hot water systems tested at National Bureau of Standards. Use of pumps, fans, controls, and solenoid valves in the pumped systems resulted in high parasitic energy consumption. Storage losses from double tank systems were greater than expected due to poor storage tank insulation. Direct systems performed better than indirect systems as expected. The thermosyphon delivered the most solar energy to the hot water load for the lowest initial cost. The air system performed poorly due to the parasitic energy consumption and poor heat transfer across the air-to-water heat exchanger. Reliable freeze protection needs to be developed for direct systems, especially thermosyphon systems, to take advantage of direct heat transfer. (ERA citation 05:015416)

SERI/TP-355-570 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Analysis of Community Solar Systems for Combined Space and Domestic Hot Water Heating Using Annual Cycle Thermal Energy Storage.
F. C. Hooper, J. D. McClenahan, J. D. Cook, F. Baylin, and R. Monte. Jan 80, 9p CONF-800101-20
Contract EG-77-C-01-4042
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

A simplified design procedure is examined for estimating the storage capacity and collector area for annual-cycle-storage, community solar heating systems in which 100% of the annual space heating energy demand is provided from the solar source for the typical meteorological year. Hourly computer simulations of the performance of these systems were carried out for 10 cities in the United States for 3 different building types and 4 community sizes. These permitted the use of design values for evaluation of a more simplified system sizing method. Results of this study show a strong correlation between annual collector efficiency and two major, location-specific, annual weather parameters: the mean air temperature during daylight hours and the total global insolation on the collector surface. Storage capacity correlates well with the net winter load, which is a measure of the seasonal variation in the total load, a correlation which appears to be independent of collector type. (ERA citation 05:015393)

SERI/TR-0924-6 PC **A03**/MF **A01**
Bickle/CM, Inc., Albuquerque, NM.
Performance Data for Passive Systems: The Bruce Hunn House.
Jun 80, 36p
Contract AC02-77CH00178

This 1955 ft exp 2 house uses a Trombe wall for space heating as well as direct gain. A rock bed storage box which is actively charged has not operated satisfactorily yet. The house, the environment, the solar system, and the data acquisition system are described. Annual and hourly test data for the house are presented. (ERA citation 05:032011)

SIB-R-12-1979 PC **A02**/MF **A01**
National Swedish Inst. for Building Research, Stockholm.
Energy from Solar Heated Air in Garrets for Water Heating and for Preheating of Ventilating Air. A Pilot Study.
T. Abrahamson. 1979, 23p
In Swedish.
U.S. Sales Only.

The possibilities to use the energy from solar heated air in garrets for water heating and for preheating of supply air have been experimentally investigated. The roofs of the studied houses were made of wood and were covered by concrete tiles. The aim was to utilize the concrete tiles and the roof as natural solar collectors for the preheating of air. In one of the studied houses the air will be used as a source of heat for a heat pump establishment for domestic water heating. The results from this investigation show that the costs of installation for such a system with a heat pump will be much lower than for a solar collector set-up giving the same energy conservation. (ERA citation 04:049744)

SOLAR/1057-79/50(Pt.1) PC **A03**/MF **A01**
Boeing Co., Seattle, WA.
Solar Project Description for Zien Mechanical Contractors-I Single Family Residence, Milwaukee, WI.
D. Beers. 5 Feb 80, 48p
Contract EX-76-A-29-1020

The Zien Mechanical site is a single family residence located in Milwaukee, Wisconsin. The home has two separate solar energy systems: an air system for space heating and cooling; a liquid system to preheat the potable hot water. Only the heating and cooling modes of operation are covered here. The space heating system is designed to supply approximately 44% of the space heating requirements for the 1388 square foot residence. A fan circulates the solar heated air through the 412.5 cubic foot rock thermal storage, across the heat pump coil, then back to the inlet side of collectors. Auxiliary space heating energy is supplied by 4-kW and 6-kW electric strip heaters. In the summer, the heat pump can also function in the cooling cycle to maintain desired temperatures in the conditioned space. The solar energy system components, heat pump compressor, evaporator, circulating fan, and rock thermal storage are located inside a sealed and insulated room in the house basement. Excessive heat buildup in the rock thermal storage is rejected to the outside ambient either through back-draft damper or through the collectors. (ERA citation 05:017553)

SOLAR/1057-79/50(Pt.2) PC **A03**/MF **A01**
Boeing Co., Seattle, WA.
Solar Project Description for Zien Mechanical II Single Family Residence, Milwaukee, Wisconsin.
D. Beers. 5 Feb 80, 44p
Contract EX-76-A-29-1020

Zien Mechanical Contractors No. 2 is a single-family residence in Milwaukee, Wisconsin. The home has approximately 1304 square feet of conditioned space. The solar energy system consists of two independently controlled systems: one system is used for domestic hot water (DHW) preheating, the other is used for space heating and cooling. Only the DHW system is described here. The solar energy system has an array of flat-plate collectors with a gross area of 77.6 square feet. Distilled water is the transfer medium that delivers solar energy from the collector array to a conventional 120-gallon DHW tank. The distilled hot water flows through a tube-in-shell exchanger assembly normally stores the distilled water when it drains from the collector after each collecting cycle. This drain-down feature protects the collectors from freezing damage. Unheated city water is fed directly to the DHW tank, and is supplied, on demand, to the DHW load. When solar energy is insufficient to satisfy the DHW load, an electrical resistance heater in the DHW tank provides auxiliary energy for DHW. No antifreeze additive is required. (ERA citation 05:017571)

SOLAR/2004-78/60 PC **A03**/MF **A01**
Mueller Associates, Inc., Baltimore, MD.
Solar Project Cost Report for Trinity University Power Plant No. 2, San Antonio, Texas.
1979, 29p
Contract W-31-109-ENG-38

Detailed cost information for the Trinity University Power Plant No. 2 solar hot water, space heating, and space cooling project located in San Antonio, Texas, is given. This retrofit solar energy system supplies space heating, cooling, and hot water for six dormitories and an athletic complex, a total of approximately 285,000 square feet of building space. The 15,633 net square feet of Northrup tracking, concentrating collectors are mounted on the top flat roofs of the athletic complex. Solar thermal energy is stored in two 20,000 gallon buried steel storage tanks. The construction costs of this solar heating and cooling project are presented. Category costs are listed by materials, direct labor, and subcontract costs. Subcontract costs include both materials and labor costs. No further breakdown of costs could be obtained. The installed cost of the system was $958,210, not including contractors' overhead and profit and general and administrative costs. A more detailed account of the data base and category cost components is provided. (ERA citation 05:028747)

SOLAR/2068-79/60 PC **A03**/MF **A01**
Mueller Associates, Inc., Baltimore, MD.
Solar Project Cost Report for Columbia Gas System Service Corporation Office Building, Columbus, Ohio.
Aug 79, 34p
Contract EG-77-C-01-2522

Detailed cost information is provided for the Columbia Gas System solar space heating, cooling, and service water heating project located in Columbus, Ohio. The solar energy system supplies space heating and cooling and service hot water for approximately 25,000 ft exp 2 of office space and stationary printing and storage in a general office building. The system was retrofitted to the building, which was constructed in 1970. The 2978 ft exp 2 of parabolic concentrating collectors were manufactured by Honeywell, Inc. For cooling, water is chilled by a 100-ton Arkla packaged water chiller. Solar heated water for use in space cooling, heating, and service water is stored in a 5000 gal hot water storage tank. The construction costs are presented. (ERA citation 05:018721)

13B. Civil Engineering

AD-A108 235/3 PC **A05**/MF **A01**
Utah State Univ., Logan. Electro-Dynamics Lab.
Down-Looking Interferometer Study II. Volume II. Handbook of Results,
Alexander S. Zachor. Mar 80, 76p SCIENTIFIC-3, AFGL-TR-80-0237
Contract F19628-77-C-0203
See also Volume 1, AD-A108 299.

This volume is a handbook of results for the Down-Looking Interferometer Study II (AFGL-TR-80-0236). Three pages of data are presented in a standard format for each candidate detection band. (Author)

AD-A108 237/9 PC **A06**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Coon Creek Dam (OFDBA Site 60-6) (Inventory Number TN 04508), Obion River Basin, near Lenox, Tennessee, Dyer County, Tennessee. Phase I Investigation Report.
Robert Ramsey. Sep 81, 106p
Contract DACW62-81-C-0056

This report is based on the findings of the Phase I investigation of OFDBA Site 60-6 on February 4, 1981 in accordance with 'Recommended Guidelines for Safety Inspection of Dams' Office of the Chief of Engineers. The earth dam is 54 feet high and 726 feet long with a crest width of 25 feet. At normal pool the dam impounds a 125 acre lake (2137 acre-feet) used for flood control. It is in the intermediate size and high hazard potential category. The downstream slope is 2.6H:1V and the upstream slope is 3H:1V. The embankment has moderate slopes and exhibited no signs of instability or uncontrolled seepage. Erosion is a major problem at this time as indicated by the presence of deep holes and gullies on the upper portion of the embankment and in the emergency spillway. Large holes were also observed below the right toe of the dam near the creek channel. The emergency spillway is a 250 foot wide grassed channel at the left abutment. There was no evidence that the spillway had ever carried flow. The principal spillway is a 36 inch diameter CMP riser with a 30 inch concrete pipe outlet. An 18 inch manually operated headgate is located at the base of the riser and is used to lower the lake level. A hydraulic and hydrologic analysis indicated that the spillway is capable of passing the recommended probable maximum flood (PMF). The dam is classified as 'unsafe non-emergency' due to the erosion on the embankment and the large holes just below the dam.

AD-A108 238/7 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Glady Hollow Dam (OFDBA Site 41-1) (Inventory Number TN 13113), Obion River Basin, near Lassiter Corner, Tennessee, Obion County, Tennessee. Phase I Investigation Report.
Robert Ramsey. Sep 81, 83p
Contract DACW62-81-C-0056

This report is based on the findings of a Phase I investigation of OFDBA Site 41-1 (Glady Hollow) Dam on February 4, 1981. This study was done in accordance with 'Recommended Guidelines for Safety Inspection of Dams', Department of the Army, Office of the Chief of Engineers. The earth dam is 32 feet high and 278 feet long with a crest width of 15 feet. It is in the small size and high hazard potential category. The structure impounds a 5.5 acre lake used for flood control. The embankment has moderate slopes 1V:3.4H upstream and 1V:2.8H downstream. No signs of uncontrolled seepage or distress was observed. A bare path has been cut into the downstream slopes by vehicles being driven up the slope. The remainder of the embankment has a well established grass cover. The principal spillway is a 24-inch CMP riser with an 18-inch CMP outlet. The drawdown facility is a 12-inch slide headgate located at the base of the riser. The emergency spillway is a 94-in wide grassed channel at the right abutment. It was in good condition and appears to have never carried flow. Analyses indicate that the spillway is adequate to pass the recommended 1/2 PMF. The dam is classified as 'deficient' due to the presence of an unvegetated area on the downstream slope.

AD-A108 239/5 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Nolan Lake Dam (Inventory Number TN 15741), Mississippi River Basin, near Memphis, Tennessee, Shelby County, Tennessee. Phase I Investigation Report.
William E. Bush. Sep 81, 76p
Contract DACW62-81-C-0056
Prepared in cooperation with Winsett-Simonds, Consterdine & Associates, Inc., Memphis, TN.

Nolan Dam has an 8.44 acre lake and is located in Shelby County, Tennessee, south of Winchester Road and east of Ross Road, and is an earth fill embankment 14.7 feet high and 640 feet long. The crest varies from 9 feet to 12 feet in width. Facilities for discharge from the reservoir are located in the east abutment and include an inlet section with a bottom width of eight feet and vertical broken concrete masonary walls two feet high. The emergency spillway is crossed by a farm road approximately 50 feet from the entrance and the fill contains four 18 inch corrugated metal pipes protected by a concrete headwall on both sides of the road. A four inch cast iron draw down pipe with a gate valve at the discharge end is located at approximately the center of the dam. The embankment slopes are approximately 1V on 3H on 2.3H to the top of the dam on the upstream slope. Neither slope has undesirable vegetation. A broken concrete masonry wall provides the vertical section of the upstream slope. Nolan Dam is in the small size category and has a downstream hazard potential classification of high by the Corps of Engineers and l by the State of Tennessee.

AD-A108 240/3 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Reed Lake Dam Number 1, (Inventory Number TN 16706) Loosahatchie River Basin near Millington, Tipton County, Tennessee. Phase I Investigation Report.
William E. Bush. Sep 81, 78p
Contract DACW62-81-C-0056
Prepared in cooperation with Winsett-Simonds, Consterdine & Associates, Inc., Memphis, TN.

Reed Lake Dam No. 1 has a 10.1 acre lake and is located in Tipton County, Tennessee one mile north of the Shelby County line and one mile west of Highway 51, and is an earth fill embankment 16.5 feet high and 530 feet long with a crest width of 14 feet. Facilities for discharge from the reservoir are a concrete service spillway, 6.8 feet high with inside dimensions of 2.1 feet by 2.7 feet and a 15 inch concrete barrel and an emergency spillway in a natural draw located on the west abutment of the dam. The natural draw has a bottom width of 33 feet and side slopes of 1V on 31H and 1V on 21H. The embankment slopes are 1V on 1.2H on the upstream slope and 1V on 3H on the downstream slope. Both slopes have some undesirable vegetation. The dam is in the small size category and has a downstream hazard potential classification of high by the Corps of Engineers and of I by the State of Tennessee. On the basis of hydraulic analysis, Reed Lake Dam flood storage (33 ac-ft) and spillways are inadequate to safely pass the 1/2 Probable Maximum Flood (PMF), which Office of the Chief of Engineers (O.C.E.) Guidelines specify to be the design flood for a dam in the small size and high hazard categories. Reed Lake Dam No. 1 is considered 'Unsafe-Non-emergency'.

AD-A108 241/1 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Reed Lake Dam Number 2 (Inventory Number TN 16707), Loosahatchie River Basin, near Millington, Tipton County, Tennessee. Phase I Investigation Report,
William E. Bush. Sep 81, 86p
Contract DACW62-81-C-0056
Prepared in cooperation with Winsett-Simonds, Consterdine & Associates, Inc., Memphis, TN.

Reed Lake Dam No. 2 has a 10.1 acre lake and is located in Tipton County, Tennessee approximately one mile north of the Shelby County line and one mile west of Highway 51, and is an earth fill embankment 14 feet high and 320 feet long and the crest width is ten feet. Facilities for discharge from the reservoir are located in the right abutment and consists of two cuts in the abutments. The new spillway has a bottom and top width of 15 feet and 47 feet respectively and the old spillway has a bottom and top width of 12 feet and 33 feet respectively. The combined discharge is 149 cfs. The embankment slopes are 1V on 2H on the upstream slope and 1V on 1H on the downstream slope. Both upstream and downstream slopes have undesirable vegetation. Reed Lake Dam No. 2 is in the small size category and has a downstream hazard potential classification of high by the Corps of Engineers and I by the State of Tennessee. On the basis of hydraulic analysis, Reed Lake Dam No. 2 flood storage (15 acre-feet) and spillways are inadequate to safely pass the 1/2 Probable Maximum Flood (PMF), which Office of the Chief of Engineers (O.C.E.) Guidelines specify to be the design flood for a dam in the small size and high hazard categories. The dam is considered 'Unsafe-Non-emergency'.

AD-A108 242/9 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Colonial Country Club - 16th Hole Dam (Inventory Number TN 15774), Wolf River Basin, near Memphis, Shelby County, Tennessee. Phase I Investigation Report,
William E. Bush. Sep 81, 82p
Contract DACW62-81-C-0056
Prepared in cooperation with Winsett-Simonds, Consterdine & Associates, Inc., Memphis, TN.

Colonial Country Club-16th Hole Dam has a 4.5 acre lake and is located in Shelby County, Tennessee in the Countrywood subdivision, and is an earth fill embankment 25 feet high and 344 feet long. The crest varies from 10 feet to 15 feet in width. Facilities for discharge from the reservoir are located in the west abutment and include a timber covered concrete structure with a 5.3 foot by 0.77 foot opening that is located in the emergency spillway ten feet landward from the control section of the emergency spillway. The emergency spillway has a cross-tie weir nine feet long. Excess water not intercepted by the service spillway is carried in a swale located between the toe of the dam and the foundations of two houses. The embankment slopes are one vertical on three horizontal. The upstream slope is partially protected by light riprap. Both the upstream and downstream slopes have undesirable vegetation. The dam is in the small size category and has a downstream hazard potential classification of high by the Corps of Engineers and I by the State of Tennessee. On the basis of hydraulic analysis, the dam flood storage (15.7 acre-feet) and spillways are adequate to safely pass the 1/2 Probable Maximum Flood (PMF), which Office of the Chief of Engineers (OCE) Guidelines specify to be the design flood for a dam in the small size and high hazard categories. (Author)

AD-A108 243/7 PC **A06**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Red Boiling Springs Dam Number 1 (Inventory Number TN 11104), Barren River Basin, near Red Boiling Springs, Macon County, Tennessee. Phase I Investigation Report,
William Culbert, Jr. Jun 81, 101p
Contract DACW62-81-C-0056

The dam is a linear earthern structure 450' long and 47.5 high with a crest width of 18'. The upstream and downstream slopes are 3.2H:1V and 3.OH:1V respectively. The surface area of the lake is 5.4 acres at normal pool and 15.5 acres at the top of the dam. On the day of the inspection the reservoir was about 2/3 full for the first filling since construction. At the left abutment is an uncontrolled earth and rock saddle spillway with a base width of 72'. The principal spillway consists of a 2.5' x 7.5' reinforced concrete riser feeding a 30' steel cylinder concrete pipe. The drawdown is a 24' formed opening at the upstream toe of the riser regulated by a manually operated 24' sliding headgate. The embankment is uniform and well grassed with no signs of cracking, sliding, or differential settlement observed on the embankment or in the area immediately downstream. There are no trees or other deleterious vegetative growth. The dam is in the intermediate size and high hazard potential category. On the basis of these classifications, the structure is required to pass the full probable maximum flood (PMF) of 28.2' of rain falling in 6 hours. Analysis reveals that the spillway is capable of passing the flood without causing the dam to overtop. Since the dam has no significant defects or inadequacies, it is considered to be 'not deficient'.

AD-A108 244/5 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Houser Creek Dam Number 2 (Inventory Number TN 13114), North Fork Obion River Basin, near Union City, Obion County, Tennessee. Phase I Investigation Report,
William E. Bush. Sep 81, 97p
Contract DACW62-81-C-0056
Prepared in cooperation with Winsett-Simonds, Consterdine & Associates, Inc., Memphis, TN.

Houser Creek Dam No. 2 is located in Obion County, Tennessee approximately 2 miles north of Union City, Tennessee. It is an earth fill embankment 26.5 feet high and 1350 feet long and impounds a 23.8 acre lake. The crest width is 14 feet. Facilities for discharge from the reservoir include a concrete service spillway with inside intake dimensions of 9 feet by 3 feet. The riser is 15 feet high located near the center of the impoundment with a 36 inch concrete pipe barrel through the dam. The emergency spillway is located in the left abutment and has a bottom width of 200 feet and side slopes of 1V on 3H. Its depth below the low point of the dam is 4.5 feet. A slide gate is attached to the upstream face of the service spillway at the bottom to draw down the impoundment. (At the time of inspection, this gate was open and the impoundment was drawn down.) The embankment slopes are approximately 1V on 3H on the downstream slope and 1V on 3H on the upstream slope. The lack of proper maintenance was found to be the major problem during the inspection of the Houser Creek Dam No. 2. A dense growth of trees and brush covered both the downstream and upstream slopes of the dam. The concrete riser also showed signs of vandalism with the removal of debris guards. The dense vegetation on the slopes of the dam prevented a close inspection of the conditions of the slope. (Author)

AD-A108 248/6 PC **A06**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Crystal Lake Dam (Inventory Number TN 06932), Hatchie River Basin, near Saulsbury, Hardeman County, Tennessee. Phase I Investigation Report,
George E. Moore. Sep 81, 106p
Contract DACW62-81-C-0056

This report is based on the findings of a Phase I inspection of Crystal Lake Dam in Hardeman County. The zoned earthfill embankment is 27 feet high and 410 feet long with a crest width of 13 feet. The embankment slopes are 1V:4.3.1H downstream. The dam impounds 63-acre-feet at normal pool level with 36 acre-feet of flood storage. The dam is in the small size, high hazard potential category. Erosion on the downstream slope of the embankment and in the emergency spillway is becoming severe. Some indications of dispersive soils were noted. The reservoir has sufficient storage/spillway capacity to pass the 1/2 PMF overtops the dam by 0.1 feet for 24 hours. Crystal Lake Dam has been assigned a condition classification of 'deficient'.

AD-A108 249/4 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Candlewood Dam (Inventory Number TN 06928), Hatchie River Basin, near Saulsbury, Hardeman County, Tennessee. Phase I Investigation Report,
George E. Moore. Sep 81, 93p
Contract DACW62-81-C-0056

This report is based on the findings of a Phase I inspection of Candlewood Lake Dam. The zoned earthfill embankment is 43.6 feet high and 800 feet long with a crest width of 24 feet. The dam is in the intermediate size and high hazard potential category. The reservoir has sufficient storage/spillway capacity to safely pass the full PMF. Erosion is evident in the emergency spillway channel, on the embankment abutment contacts, and on the downstream slope. Some indications of dispersive soils were noted on the downstream slope. Also, the downstream slope appeared to be excessively moist and some standing water was seen. Due to these findings, Candlewood Lake Dam is considered to be 'significantly deficient'.

AD-A108 250/2 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Chancellor & Son Dam (Inventory Number TN 06939), Hatchie River Basin, near Saulsbury, Hardeman County, Tennessee. Phase I Investigation Report,
George E. Moore. Sep 81, 87p
Contract DACW62-81-C-0056

This report is based on the findings of a Phase I inspection of Chancellor and Son Dam in Hardeman County. The earthfill embankment is 24 feet high and 550 feet long with a crest width of 15 feet. The service spillway is a 36 inch concrete culvert passing through the embankment near the crest. The drawdown drain is a 10 inch corrugated metal pipe with a slide gate at the inlet and a plug in the outlet. The emergency spillway is a triangular earth channel at the left end of the dam. The available data is insufficient to assess the potential affect of the seepage on the embankment. The reservoir has sufficient storage/spillway capacity to pass the PMF, but the embankment portion of the emergency spillway would probably deteriorate rapidly under high stage flows. Also, the service spillway is not properly designed to pass large flows. The spillways are therefore considered to be seriously inadequate. Because of these findings, Chancellor and Son Dam is considered to have a condition classification of 'unsafe nonemergency'.

AD-A108 251/0 PC **A07**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. McNairy Cypress Creek Watershed Dam Number 17 (Inventory Number TN 10908), Tuscumbia River Basin, near Selmer, McNairy County, Tennessee. Phase I Investigation Report,
George E. Moore. Sep 81, 140p
Contract DACW62-81-C-0056

McNairy Cypress Creek Dam Number 17 is located in McNairy County, Tennessee, about 0.5 miles east of Selmer. The dam is an earthfill embankment 34.1 feet high and 960 feet long with a crest width of 15 feet. The dam impounds a 13 acre lake. McNairy Cypress Creek Dam Number 17 is in the small size category and has a downstream hazard potential classification of 'high' under OCE guidelines and category 1 by the State of Tennessee. On the basis of hydraulic analysis, the dam has adequate storage/spillway capacity to pass the 1/2 probable maximum flood (PMF) under antecedent moisture condition III (AMC III). The 1/2 PMF is the minimum storm required under OCE guidelines for a dam in the small size and high hazard potential classifications. At this time, the dam is considered not deficient. It is recommended that any erosion be repaired and a soil binding grass cover established on the embankment.

AD-A108 252/8 PC **A07**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Lambert Dam (Inventory Number TN 00901), Little Tennessee River Basin, near Six Mile, Blount County, Tennessee. Phase I Investigation Report,
Paul F. Bluhm. Sep 81, 127p
Contract DACW62-81-C-0056

Lambert Dam is a linear earthfill structure 605 feet long and 53 feet high with a crest width of 18 feet. The upstream and downstream slopes are IV on 3.8H and IV on 3.4H respectively. It has a capacity of 336 acre-feet at normal pool and 454 acre-feet at the top of the dam. The dam is in the intermediate size and high potential category and should pass the Probable Maximum Flood (PMF). A hydraulic and hydrologic analysis reveals that during the PMF the dam will overtop by 1.3 feet for 4.75 hours. During the 1/2 PMF, the dam overtops by .65 feet for three hours. The embankment appears to be structurally stable; however, it is considered significantly deficient because the spillway is inadequate. It is recommended that a qualified engineer be engaged to develop project modifications that will allow the dam to pass the PMF and that the owner perform routine maintenance operations.

AD-A108 256/9 MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Woodrun Dam Number 1 & 2 (Inventory Number TN 06927 and TN 06933), Hatchie River Basin, near Rogers Springs, Hardeman County, Tennessee. Phase I Investigation Report,
William Culbert, Jr. Sep 81, 126p
Contract DACW62-81-C-0056
Availability: Microfiche copies only.

Woodrun Dams No. 1 (west dam) and No. 2 (east dam) are colinear earthen structures 885 feet and 945 feet long respectively. The impoundments of each structure are interconnected by a channel forming a single 43 acre lake. Dam No. 1 is 27.5 feet in height with a crest width of 15 feet. Its upstream and downstream slopes are 1V:2.5H and 1V:2.8H respectively. Dam No. 2 is 33.2 feet in height with a crest width of 10 feet. Its upstream and downstream slopes are 1V:2.7H and 1V:3.6H respectively. Both dams are uniform in cross section and host no deleterious vegetation. The reservoir has a drainage area of 249 acres. It is predominately wood-land with an average ground slope of approximately 14%. The downstream slope of Dam No. 1 is wet with seepage beginning approximately 20 feet below the crest extending to the toe and becoming attenuated toward the ends of the dam. The seepage area is accompanied by moderate erosion near the maximum section. A property owner has dug a narrow ditch along part of the toe to channel seepage from his land. Pooled seepage exists along much of the channel and a clear flow of approximately 1/2 gpm was observed emanating from its upstream side. Seepage also exists on the downstream slope of Dam No. 2. It extends over a large area beginning approximately 200 feet right of the principal spillway, emerging from the slope 10-15 feet below the dam crest. The dam is not as wet and eroded as Dam No. 1, indicating that seepage is not as profuse. The principal spillway consists of a 30 in. steel pipe riser and a 30 in. outlet culvert of similar construction.

AD-A108 257/7 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Lever Lake Dam (Inventory Number TN 18708), Harpeth River Basin, near Kingston Springs, Williamson County, Tennessee. Phase I Investigation Report,
William Culbert, Jr. Jul 81, 98p
Contract DACW62-81-C-0056

The dam is a linear earthen structure 163 feet long and 26.4 feet high with a crest width of 11 feet. The upstream and downstream slopes are both 1.4H:1V. The surface area of the lake is 3.7 acres at normal pool and 5.8 acres at the top of the dam. The 104 acre drainage area of the reservoir is predominantly woodland and meadow with an average ground slope of approximately 14%. Reportedly, water seeps slowly through fissures in the natural ground into a 0.4 acre lake 200 feet right of Lever. This dam was built for the purpose of maintaining pressure on the seeps and thereby maintaining the pool level of the larger lake. OCE guidelines recommend that small, high hazard dams such as Lever pass the one-half Probable Maximum Flood (1/2 PMF) to the full PMF. Analysis reveals that the dam will be overtopped by 0.6 feet for 0.6 hours under the 1/2 PMF. The reservoir contains the 100-year frequency storm maintaining 3 feet of freeboard. The dam is given a condition classification of 'unsafe - nonemergency' because of its spillway limitations and because the steepness of its downstream slope constitutes a stability concern. It is recommended that a qualified engineer be retained to study the embankment stability and the hydraulic limitations of the spillway and make recommendations for their correction.

AD-A108 258/5 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Jennings Creek Watershed Dam Number 15 (Inventory Number TN 08705), Cumberland River Basin, near North Springs, Jackson County, Tennessee. Phase I Investigation Report,
William Culbert, Jr. Jun 81, 99p
Contract DACW62-81-C-0056

The dam is a linear earthen structure 310 feet long and 44.7 feet high with a crest width of 14 feet. The upstream and downstream slopes are 2.6H:1V and 2.5H:1V respectively. The embankment is free of undesirable vegetation except for some scattered 1/2 - 2 in. diameter heavenwood trees. Most of these are at the downstream right toe and abutment tie-in. No signs of sliding, cracking, or differential settlement were observed on the dam or in the area immediately downstream. Erosion was insignificant. On the basis of a federal hazard potential classification of 'high' and an 'intermediate' size classification, the dam should pass the full Probable Maximum Flood (PMF) of 28.5 in. of rain falling in 6 hours. Analysis reveals that the dam will overtop by about 3.4 ft. for 1.8 hours during this storm. The 1/2 PMF will also overtop the structure. The dam received a condition classification of 'significantly deficient' because of its spillway limitations. It is recommended that a qualified engineer be engaged to develop project modifications that will allow the dam to pass the PMF and that the owner perform various maintenance operations.

AD-A108 259/3 MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Sweetwater Creek Watershed Dam Number 15 (Inventory Number TN 12314), Tennessee River Basin, near Sweetwater, Monroe County, Tennessee. Phase I Investigation Report,
George E. Moore. Sep 81, 145p
Contract DACW62-81-C-0056
Availability: Microfiche copies only.

The Dam is located in Monroe County about 0.7 miles southwest of Sweetwater, Tennessee and is an earthfill embankment 46 feet high and 1100 feet long. The crest width is 19 feet. The embankment slopes are 1V:3H and berms are located on both the upstream and downstream slopes. The dam controls a 1005 acre drainage area and is intended to impound the 9.4 acre Sherman F. Owen Lake. The service spillway is a 2 stage standard SCS cast in place concrete riser leading to a 30-inch diameter reinforced concrete pipe. The service spillway outlet has an SCS standard baffled impact basin. The drawdown drain is a 24-inch diameter orifice controlled by a slide gate at the base of the riser. The emergency spillway is an uncontrolled earth saddle on the left abutment. The channel has a trapezoidal cross-section with a 200 foot base and 1V:3H side slopes. The reservoir has a leak which has prevented filling of the lake and is apparently due to an open solution channel that is draining into another watershed. The leak is not expected to affect the structural stability of the dam. No indications of instability were observed. The Dam is in the intermediate size category and has a downstream hazard potential classification of high under Corps of Engineers criteria and 1 under State criteria. On the basis of hydraulic analysis, the dam has adequate storage/spillway capacity to pass the probable maximum flood (PMF) under antecedent moisture condition II (AMC II). Under OCE guidelines, a dam in the intermediate size and high hazard potential classification is required to pass the PMF. (Author)

AD-A108 260/1 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Akers Dam (Inventory Number TN 16503), Barren River Basin, near Turners Station, Sumner County, Tennessee. Phase I Investigation Report,
Troy A. Wedekind. Sep 81, 79p
Contract DACW62-81-C-0056

Akers Dam intercepts a small unnamed tributary of the Little Trammel Creek about one mile southeast of the Turners Station Community in Sumner County. The crest of the 26 foot high, earthfilled embankment is 11 feet wide and 280 feet long. The upstream slope is approximately 1V:1.4H and the downstream slope varies from 1V:1.5H to 1V:2.5H. The stability of the downstream face is questionable due to the steep slopes, extensive seepage, and emergence of the phreatic surface high on the downstream face. The reservoir discharges through a 23 foot wide saddle service/emergency spillway that is 150 long and located on the left abutment. Hydraulic analysis revealed the spillway to be marginally adequate to pass the 1/2 PMF, which is the design storm specified by the guidelines of the Office of the Chief of Engineers (OCE), for a dam in the small size and high hazard potential categories. At this time, the dam is considered unsafe-nonemergency. It is recommended that a qualified engineer be engaged immediately to determine modifications necessary for improving slope stability, seepage control, and determining condition of the drawdown drain along with moving the drawdown drain to the upstream end. (Author)

AD-A108 261/9 MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Mary's Creek Dam Number 9 (Inventory Number TN 15739), Wolf River Basin, near Cross Roads, Shelby County, Tennessee. Phase I Investigation Report.
William Culbert, Jr. Sep 81, 76p
Contract DACW62-81-C-0056
Availability: Microfiche copies only.

The dam is a linear earthen structure 678 feet long and 23.7 feet high with a crest width of 10 feet. The upstream and downstream slopes are 1V:3.1H and 1V:3.OH respectively. The structure impounds a 10.5 acre lake at normal pool with 42 acre-feet of storage. At the top of the dam the pool area increases to 18 acres with an impoundage of 148 acre-feet. The drainage area is predominantly farmland, pasture, and woods. It has an average ground slope of approximately 5.7%. The embankment is well grassed and virtually free of undesirable vegetation. It has a relatively uniform cross section with well defined boundaries. Only minor erosion was observed on the embankment, along the upstream slope at the water surface and along the cattle trail traversing the dam.

AD-A108 299/9 PC **A07**/MF **A01**
Utah State Univ., Logan. Electro-Dynamics Lab.
Down-Looking Interferometer Study II, Volume I,
Alexander S. Zachor. Mar 80, 140p SCIENTIFIC-2, AFGL-TR-80-0236
Contract F19628-77-C-0203
See also Volume 2, AD-A108 235. Prepared in cooperation with Atmospheric Radiation Consultants, Inc., Acton, MA.

This study defines parametrically the capability of a high-flying spectrometer system to detect and charac-

terize particular gaseous emissions by ground level stationary sources. The systems considered utilize a Fourier Transform Spectrometer (FTS) employing mosaic focal planes together with optical designs or data processing techniques that effect 'background subtraction'. Detection and quantification are based on the correlation of the observed target spectral contrast with predicted target spectral signatures. (Author)

AD-A108 302/1 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Use of Impervious Covers and Carbon Adsorption for the Control of Leachate Production in Municipal Landfills.
Master's thesis,
Richard Charles Carmichael. May 79, 115p Rept no. AFIT-CI-79-298T-S

The most popular method for the disposal of solid wastes in the United States is by landfill. A proper landfill, termed sanitary landfill, is one which is located, designed, and operated to minimize or eliminate environmental impact. One potential environmental impact is contamination of ground- and/or surface water. The potential for contamination exists because within a land disposal site various physical, chemical, and biological processes occur which produce compounds that can be dissolved or suspended in water. Water thus contaminated is termed leachate. There are two and possibly three stages of leachate production in a land disposal site. The first leachate production arises from the compression and compaction of the solid wastes. The second leachate production is due to water produced during decomposition. The third and by far the most significant stage of leachate production is due to water infiltration. A comprehensive literature review was performed to determine if water-impervious (but gas-permeable) covers could be employed to prevent water intrusion and thus stage 3 leachate production in sanitary landfills. The costs and advantages/disadvantages of covering a landfill to prevent water intrusion versus lining a landfill to collect and treat stage 3 leachate were compared. Basically the prevention of stage 3 leachate production appeared the most practical engineering approach. Next the changing composition of municipal refuse was investigated to determine if stage 1 and stage 2 leachate production would continue to be a problem. The literature search indicated a trend toward an increased moisture content of municipal solid wastes and thus a continuation of production of stage 1 and stage 2 leachate.

AD-A108 341/9 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Subsea Trenching in the Arctic,
Malcolm Mellor. Sep 81, 38p Rept no. CRREL-81-17

Environmental conditions are described for the continental shelf of the western Arctic, and for the shelf of Labrador and Newfoundland. Special emphasis is given to the gouging of bottom sediments by ice pressure ridges and icebergs, and an approach to systematic risk analysis is outlined. Protection os subsea pipelines and cables by trenching and direct embedment is discussed, touching on burial depth, degree of protection, and environmental impact. Conventional land techniques can be adapted for trenching across the beach and through the shallows, but in deeper water special equipment is required. The devices discussed include hydraulic dredges, submarine dredges, plows, rippers, water jets, disc saws and wheel ditchers, ladder trenchers and chain saws, routers and slot millers, ladder dredges, vibratory and percussive machines, and blasting systems. Consideration is given to the relative merits of working with seabed vehicles, or alternatively with direct surface support from vessels or from the sea ice. (Author)

AD-A108 391/4 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Questioned Highway Safety Program Costs in Mississippi.
29 Sep 81, 23p Rept no. GAO/CED-81-155
Report to the Honorable John C. Stennis, United States Senate.

The Department of Transportation's Office of Inspector General conducted two audits of the Mississippi State Highway Safety Grant Program at the request of the National Highway Traffic Safety Administration. GAO believes that the State's response to questions raised during the audits was, on the whole, given a fair and equitable review by the Safety Administration. However, some actions of each party to the process may have complicated and prolonged the audit resolution process. (Author)

AD-A108 442/5 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Mission Analysis and Acquisition Div.
Status of the Center City Commuter Connection Project, Philadelphia, Pennsylvania.
6 Oct 81, 7p Rept no. GAO/MASAD-82-1
Report to The Secretary of Transportation.

We examined the status of the Center City Commuter Connection project, a 1.7 mile, 4-track tunnel, in Philadelphia, Pennsylvania, which will link two separate commuter rail lines currently in operation. This project is primarily financed with a capital assistance grant from the Urban Mass Transportation Administration (UMTA), authorized under section 3 of the Urban Mass Transportation Act of 1964. We found that costs of other related projects not part of the Center City Commuter Connection construction grant had not been determined and, therefore, not considered when the grant was awarded. When these costs are considered, the cost of the project is substantially increased. Further, UMTA and Philadelphia city officials have not assured that all grant conditions have been met. Also, current operating problems in Philadelphia's commuter rail system have led to decreased ridership which if it continues, would make the value of the tunnel questionable. Accordingly, we are making recommendations with the hope that similar problems will not recur on future UMTA grants and to identify ways to maintain ridership so that the investment in the Center City Commuter Connection can provide its full benefits. (Author)

AD-A108 464/9 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Construction Products Dam (Inventory Number TN 11320), Middle Fork Forked Deer River Basin, near Carroll, Madison County, Tennessee. Phase I Investigation Report,
Robert Ramsey. Jul 81, 83p
Contract DACW62-81-C-0056

The earth dam is 15 ft. high, 675 ft. long, and has a crest width of 13 feet. It is in the small size and high hazard potential category. The dam impounds a 5.5 acre lake used for recreation and water supply. The embankment slopes are moderate and have a well established grass cover. Vehicles have cut deep ruts into the crest. The principal spillway is a 36 inch diameter CMP riser with a 30 inch diameter CMP outlet. A slide headgate is located at the base of the riser to regulate the lake level. The emergency spillway is a irregular shaped earth channel at the left abutment. The channel is relatively flat and in good condition. The dam is classified as 'significantly deficient' because the spillway will not safely pass the recommended one-half Probable Maximum Flood.

AD-A108 465/6 PC **A06**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams Tennessee. Cumberland Springs Lake Dam (Inventory Number TN 12701), Elk River Basin, near Lynchburg, Moore County, Tennessee. Phase I Investigation Report,
William E. Bush. Sep 81, 108p
Contract DACW62-81-C-0056
Prepared in cooperation with Winsett-Simonds, Consterdine and Associates, Inc., Memphis, TN.

Cumberland Springs Dam has an 8.3 acre lake and is located near the head of Hurricane Creek in Moore County, Tennessee. The concrete gravity structure has a maximum constructed height of 33 feet and a length of 192 feet, including a 36 foot long ogee spillway. The spillway section also includes a drawdown pipe that is gated on the upstream face. The concrete dam is reinforced with six buttresses on the downstream face. The exposed surfaces of the buttresses are badly weathered with horizontal cracks 6 inches deep on the vertical faces. A horizontal crack was observed on the downstream face of the dam approximately 10 feet above the foundation sill. This crack appears to be in a construction 'cold' joint. Seeps were found in the east end wall and along the foundation sill between buttresses 1 and 2 and 2 and 3. Numerous springs were flowing immediately below the dam and both abutments. Cumberland Springs Dam is in the small size category and has a downstream hazard potential classification of high by the Corps of Engineers and 'I' by the State of Tennessee. On the basis of hydraulic analysis. Cumberland Springs Dam flood storage (15.8 acre-feet) and emergency spillway are inadequate to safely pass the 1/2 Probable Maximum Flood (PMF), which Office of the Chief of Engineers (O.C.E.) Guidelines specify to be the design flood for a dam in the small size and high hazard potential categories. At this time, the dam is considered 'unsafe-nonemergency'.

AD-A108 466/4 PC **A10**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Spring Lake Dam (Candlewood II) Old Hickory Dam (Candlewood III) (Inventory Numbers TN 06930 & TN 06926), Hatchie River Basin, near Saulsbury, Hardeman County, Tennessee. Phase I Investigation Report,
George E. Moore. Sep 81, 223p
Contract DACW62-81-C-0056

Based on the findings of a Phase I inspection of Spring Lake and Old Hickory Lake Dams in Hardeman County; Spring and Old Hickory Lake Dams are in series with each other and with Chancellor Dam upstream. The dams are of similar construction nad have the same owner. Spring Lake Dam is a zoned earthfill embankment 21.5 feet high and 400 feet long with a crest width of 12 feet. The side slopes are 3H;1V upstream and 3.7H:1V downstream. The service spillway is a concrete riser with two 1 ft x r openings leading to a 15 inch concrete pipe passing under the dam. The drawdown drain is a 15 inch diameter gate valve at the base of the riser. The emergency spillway is a trapezoidal earth saddle on the right abutment with an estimated capacity of 3500 cfs. Old Hickory Dam is a zoned earthfill embankment 20.5 feet high and 530 feet long with a crest width of 12 feet. The side slopes are 3.5H:1V upstream and 3.9H:1V downstream. The service spillway is a concrete riser with two 1 x 4 openings leading to a 24 inch concrete pipe passing under the dam. The draw-down drain is a 24 inch gate valve at the base of the riser. The emergency spillway is a trapezoidal earth saddle on the left abutment with an estimated capacity of 4670 cfs. Both dams are in the small size high hazard potential categories. Neither dam shows any overt signs of instability.

AD-A108 467/2 PC **A06**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Portland City Lake Dam (Inventory Number TN 16510), Barren River Basin, near Portland, Sumner County, Tennessee. Phase I Investigation Report,
William. E. Bush. Sep 81, 115p
Contract DACW62-81-C-0056
Prepared in cooperation with Winsett-Simmonds, Consterdine and Associates, Inc., Memphis, TN.

Portland City Lake Dam has an 35.5 acre lake and is located in Sumner County, Tennessee 2.5 miles northeast of Portland, Tennessee and is an earth fill embankment 32.8 feet high and 600 feet long. The crest width is 20 feet. Facilities for discharge from the reservoir are a low level outlet consisting of a 16 inch cast iron pipe through the dam with a valve on the outlet end and a water supply pipe of unknown diameter with a valve located in the lake. The emergency spillway is in the south abutment and consists of a concrete bottom 21 feet wide and layback concrete walls 4 feet high. The spillway is crossed by a road with four 48 inch concrete pipes set on top of the concrete chute to support the road. The embankment slopes are approximately 1V on 3H on the downstream slope and 1V on 3.1H on the upstream slope. Both slopes have undesirable vegetation. The emergency spillway has major problems which could lead to considerable damage including possible failure during a period of high flow in the spillway, also the spillway is inadequate to pass the 1/2 PMF (design flood) without overtopping the dam. Other problems include probable seep areas at the north abutment as the lake level approaches or exceeds normal pool elevations and the valve location on the drawdown pipe.

AD-A108 468/0 PC **A04**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.

National Program of Inspection of Non-Federal Dams, Tennessee. Kagley Dam (Inventory Number TN 00908), Little Tennessee River Basin, near Wellsville, Blount County, Tennessee. Phase I Investigation Report,
Troy A. Wedekind. Sep 81, 73p
Contract DACW62-81-C-0056

Kagley Dam intercepts an unnamed tributary of Sixmile Creek about one mile south of the Mint Community in Blount County. The crest of the 27.6 foot high earth-filled embankment is 12 feet wide and 168 feet long. Means of discharge from the reservoir include a riser with a 6 inch outlet and a parabolic open channel spillway in the right abutment. The embankment slopes, greater than 1V:3H, do not appear to be steep and there is no evidence of slides or other signs of instability. A soft area on the downstream face near the middle of the embankment does not appear to threaten the safety of the dam. A break in the service spillway outlet pipe near the toe allowed erosion of the embankment to form a 4 foot diameter hole over the break. Although this break does not jeopardize the integrity of the embankment, the possibility of other breaks due to embankment settlement poses a threat to the safety of the dam. Kagley Dam is classified in the small size and high hazard potential categories and therefore is required to pass a design storm of between the half and full probable maximum flood (PMF). Hydraulic analysis reveals the spillway to be seriously inadequate due to the inability to pass the 100 year storm which overtops the dam by a maximum depth of 0.18 feet for a duration of 2.57 hours. The dam is overtopped by the 1/2 PMF by a maximum depth of 1.8 feet for a duration of 5.66 hours.

AD-A108 469/8 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Jesse Byrd Dam (Inventory Number TN 07518), South Fork Forked Deer River Basin, near Providence, Haywood County, Tennessee. Phase I Investigation Report,
William E. Bush. Sep 81, 85p
Contract DACW62-81-C-0056
Prepared in cooperation with Winsett-Simmonds, Consterdine and Associates, Inc., Memphis, TN.

Jesse Byrd Dam is located in Haywood County, Tennessee eleven miles northeast of Brownsville Tennessee and is an earth fill embankment 28.7 feet high and 518 feet long. The crest width is ten feet. Facilities for discharge of the reservoir include a service spillway located near the center of the dam that has an 18 inch asphalt coated corrugated metal riser with a 12 inch asphalt coated corrugated metal pipe barrel and a two foot section of 36 inch corrugated metal pipe attached to the top of the riser to serve as an antivortex baffle and debris guard. A slide gate is attached to the bottom of the riser to provide a means of draw down the lake. The emergency spillway is located in the left abutment in a natural swale that has had some shaping. The spillway has a bottom width of 60 feet and side slopes of 1V on 23H and 1V on 13H. Its depth of flow below the low point of the dam is 3.0 feet and its maximum capacity at this depth was calculated to be 337 cfs. The embankment slopes are 1V on 3H. The upstream slope has no wave protection. The downstream slope has undesirable vegetation. Jesse Byrd Dam is in the small size category and has a downstream hazard potential classification of high by the USCE and 'I' by the State of Tennessee.

AD-A108 470/6 PC **A14**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. 8th Avenue Reservoir (Inventory Number TN 03719), Cumberland River Basin, Nashville, Davidson County, Tennessee. Phase I Investigation Report,
Paul F. Bluhm. Sep 81, 324p
Contract DACW62-81-C-0056

8th Avenue Reservoir is in the high hazard and small size classification and according to OCE guidelines must pass the 1/2 to full PMF. Because the only inflow would be the rainfall itself, the reservoir, with its three feet of freeboard, would be able to contain the full PMP of 29.3 inches. The reservoir appeared to be in good condition and structurally stable. No significant seepage, wet areas, sinkholes or cracks were found on or near the reservoir. Seepage was occuring in the dry well of the gate house and calcium carbonate deposits were observed on the exterior stone of the reservoir wall; however, neither considered serious at this time. Structure is given a condition classification of 'deficient' because of the seepage in the gate house well and the minor concrete spalling on the walkway of the reservoir.

AD-A108 471/4 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Cane Creek Dam Number 19 (Inventory Number TN 09705), Hatchie River Basin, Near Ripley, Lauderdale County, Tennessee. Phase I Investigation Report,
William Culbert, Jr. Sep 81, 98p
Contract DACW62-81-C-0056

The crest undergoes little change in elevation and has a fairly constant width but ruts from vehicular traffic are predominant along much of the surface. The downstream slope of the dam is traversed by cattle trails nearly paralleling one another at different elevations from the toe to the dam crest. Some vehicular traffic has apparently also been occurring on the slope in the area of the principal spillway outlet. The upstream slope of the dam has been sloughed off below elevation 352 along most of the length of the dam. The embankment is reasonably well grassed and free of undesirable vegetation. There are some wet areas along the downstream toe but they are apparently pooled surface runoff and not the result of seepage. Because the reservoir was empty during the inspection, any active seepage flow that may normally occur did not appear, but no indications of a previous seepage flow were observed on the slope. The principal spillway consists of a reinforced concrete riser feeding a 156 foot, 30 inch diameter reinforced concrete culvert. The emergency spillway is an uncontrolled saddle type trapezoidal earthen channel at the left end of the dam. It has an 80 foot base, 1V:4.6H side slopes, and 2.1 feet of available head. OCE guidelines recommend that high hazard dams of intermediate size pass the full Probable Maximum Flood. Hydraulic and hydrologic analysis reveal that the dam will be overtopped by a maximum of 2.4 feet for 7.2 hours (AMC II) under the influence of this storm. The dam is given a condition classification of 'unsafe nonemergency' because of its seriously inadequate spillway.

AD-A108 472/2 PC **A07**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Marys Creek Dam Number 8 (Inventory Number TN 15727), Wolf River Basin, near Cross Roads, Shelby County, Tennessee. Phase I Investigation Report,
William Culbert, Jr. Sep 81, 136p
Contract DACW62-81-C-0056

The dam is uniform well grassed and clear of any deleterious vegetation. The upstream slope of the embankment shows appreciable sloughing near the principal spillway. Scattered minor depressions appear sporadically along the downstream slope, presumably the result of dispersive soil. There are no indications of seepage on the slope or in the area downstream of the dam. No signs of differential settlement or other slope instabilities were observed. Appreciable erosion occurs near the water surface and along the upstream left side slope, apparently the result of cattle congregating in these areas. The dam is in the high hazard potential and small size classifications. OCE guidelines require such dams to pass the one-half probable maximum flood (1/2 PMF) to full PMF. Hydraulic and hydrologic analyses reveal that the emergency spillway is capable of passing the 1/2 PMF without causing the dam to overtop not breach during the storm. The upstream dam will overtop under the 1/2 PMF. Should failure of the upstream dam occur, analysis indicates that Mary's Creek Dam will be overtopped by 0.2 feet for 1.8 hours. The dam is given a condition classification of 'deficient' because of the erosion near the emergency spillway entrance and elsewhere along the upstream slope.

AD-A108 473/0 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Grand Valley Dam Number 1 (Inventory Number TN 06924) Hatchie River Basin, near Hickory Valley, Hardeman County, Tennessee. Phase I Investigation Report,
William E. Bush. Sep 81, 100p
Contract DACW62-81-C-0056
Prepared in cooperation with Winsett, Simmonds, Consterdine and Associates, Inc., Memphis, TN.

Grand Valley Dam No. 1 is located in Hardeman County, Tennessee several miles east of Hickory Valley, Tennessee and is an earth fill embankment 37 feet high and 1800 feet long. The crest width is 26 feet. Facilities for discharge from the reservoir are located near the south abutment and consist of a concrete service spillway 11 feet by 8 feet with two 9.0 foot by 0.83 feet openings and a 42 inch CM pipe barrel through the dam and an emergency spillway constructed as a low area in the top of the dam. The emergency spillway has gentle side slopes and a 50 foot wide bottom section. The entrance and exit slopes are 1V on 3H on the upstream slope and 1V on 4H on the downstream slope. No protection is provided for the exit slope. The upstream slope is vertical from the waterline for approximately two feet. The slope from that point to the crest is one vertical on three horizontal. The downstream slope is generally one vertical on four horizontal. Both the upstream and downstream slopes have ineffective vegetation. The dam is in the intermediate size category and has a downstream hazard potential classification of high by the USCE and 'I' by the State of Tennessee. On the basis of hydraulic analysis, the dam has flood storage (572 acre-feet) and spillways inadequate to safely pass the Probable Maximum Flood (PMF).

AD-A108 474/8 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. Grand Valley Dam Number 2 (Inventory Number TN 06925), Hatchie River Basin, Near Hickory Valley, Hardeman County, Tennessee. Phase I Investigation Report,
William E. Bush. Sep 81, 80p
Contract DACW62-81-C-0056
Prepared in cooperation with Winsett, Simmonds, Consterdine and Associates, Inc., Memphis, TN.

Grand Valley Dam No. 2 is located in Hardeman County, Tennessee seven miles east of Hickory Valley, Tennessee and is an earth fill embankment 16 feet high and 560 feet long with a crest width of 22 feet. Facilities for discharge for the reservoir are located in the left abutment and include a 24 inch corrugated metal pipe culvert through the dam, and an emergency spillway cut into the right abutment. This spillway is trapezoidal shaped with a bottom width of 50 feet. A paved road fill crosses the spillway at approximately the location of the control section and effectively cuts off the spillway from use. The embankment slopes are 1 vertical on 3 horizontal from the water line to the top of the dam on the upstream slope. The downstream slope averages 1 vertical on 3 horizontal. The upstream slope is free of undesirable growth and debris but the downstream slope is covered with high grass and small saplings. On the basis of hydraulic analysis, flood storage (95 acre-feet) and spillways are insufficient to safely pass the 1/2 Probable Maximum Flood (PMF) which the Office of the Chief of Engineers (OCE) Guidelines specify to be the design flood for a dam in the small size and high hazard categories. The dam is in the small size category and has a downstream hazard potential classification of high by the USCE and '1' by the State of Tennessee.

AD-A108 475/5 PC **A05**/MF **A01**
Tennessee Dept. of Conservation, Nashville. Div. of Water Resources.
National Program of Inspection of Non-Federal Dams, Tennessee. (Inventory Number TN 11101), Cumberland River Basin, Jennings Creek Watershed Dam Number 16 near North Springs, Macon County, Tennessee. Phase 1 Investigation Report,
William Culbert, Jr. Jun 81, 100p
Contract DACW62-81-C-0056

The dam is a linear earthen structure 325 feet long and 47.1 feet high with a crest width of 13 feet. The upstream and downstream slopes are 2.4H:1V and 2.7H:1V respectively. It is in the intermediate size and high ahzard potential classifications. The lake area is 7 acres at normal pool, increasing to 23 acres at the top

of the dam. The service spillway is a 2 ft x 6 ft (inside diameter) concrete riser with a 15-in. steel cylinder concrete pipe. The drawdown consists of a 16-in. diameter formed opening feeding into the riser controlled by a 24-in. slide headgate. The emergency spillway is an open channel excavated in rock at the right side of the embankment. It has a base width of 25 feet and is trapezoidal in shape. The dam is well grassed and free of undesirable vegetation. Its slopes are uniform and well defined and exhibit no signs of structural instability. Some minor erosion exists on the downstream slope in two areas where construction equipment and 4-wheel drive vehicles have destroyed the grass cover. No cracks, signs of seepage, sliding, or differential settlement were observed on the dam or in the area immediately downstream. The dam is given a safety classification of 'significantly deficient' because of its spillway limitations. It is recommended that a qualified engineer be engaged to develop project modifications that will allow the dam to pass the PMF, and that the owner perform various maintenance operations. (Author)

AD-A108 551/3 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Structures Lab.
Structural Stability Evaluation, Pine River Dam.
Final rept.,
Carl E. Pace. Oct 81, 100p Rept no. WES/MP/SL-81-31
Contract NCS-1A-78-75

A stability analysis was conducted for a typical interior monolith of Pine River Dam for the following load cases: (1) Normal operation; (2) Normal operation with truck loading (H15-44); (3) Normal operation with earthquake; (4) Normal operation with ice; and (5) High-water condition. A conventional stability analysis (rigid body assumption) was conducted to determine the approximate magnitude of the loads acting on the top of the piles, which support the dam piers. The compressive forces, tensile forces, and deflections predicted for the piles for all load cases were acceptable. However, the shear stresses at the top of the piles and stresses in certain piles were predicted greater than the allowable values. Therefore, it is recommended that a slant-hole, soil anchor system be used to induce compressive forces that will cause the shear and flexural stresses to be below allowables. From tests on cores, it was determined that the unconfined compressive strength (5600 psi) was adequate. There appears to be some variation in quality of the interior concrete, but it should not be detrimental as long as it does not affect the posttensioning construction. Surface concrete deterioration should be repaired. After the slant-hole soil anchors are installed and the deteriorated concrete surfaces repaired, the useful life of the dam will be appreciably lengthened.

AD-A108 571/1 PC **A05**/MF **A01**
Army Mobility Equipment Research and Development Command, Fort Belvoir, VA.
Renovation of Waste Shower Water by Membrane Filtration.
Interim rept. Jun 74-Nov 76,
Daniel S. Lent. Nov 76, 83p USCG-D-25-77
Contract MIPR-Z-70099-4-43107

In accordance with current efforts for environmental protection and energy conservation, the U.S. Coast Guard is considering shower wastewater treatment for reuse as laundry water aboard water craft. A process being investigated for this purpose is ultrafiltration. Five off-the-shelf ultrafiltration systems were considered containing membrane fiber configurations of tubular, spiral-wound, hollow and plate-and-frame. Ultrafiltration rates (fluxes) along with power requirements were observed to vary significantly depending on the system and the membrane configuration used. The treated water was of suitable quality for reuse as laundry water. Although membrane cleaning could recover flux, the rate of flux decline was faster for cleaned membranes than new membranes. To protect the system, pretreatment is required to remove hair and other fibers from the feedwater prior to application to the membranes. The hollow-fiber membrane configuration is the only membrane configuration not requiring chemicals for membrane cleaning. (Author)

AD-A108 579/4 PC **A03**/MF **A01**
Missouri Univ.-Rolla. Inst. of River Studies.
Investigate the Potential for Nitrogen Supersaturation at Clarence Cannon Dam and Reservoir, Salt River, Missouri,
Charles D. Morris, and Nord L. Gale. 30 Oct 80, 49p
Contract DACW43-80-M-2248

The purpose of this investigation is to analyze the potential of the Clarence Cannon Dam and Reservoir to produce nitrogen supersaturation under any operating condition, including conditions during construction. (Author)

AD-A108 617/2 PC **A05**/MF **A01**
Department of the Air Force, Washington, DC.
Environmental Impact Analysis Process. Deployment Area Selection and Land Withdrawal/Acquisition DEIS.
Summary rept.
Dec 80, 83p
See also AD-A108 618. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The United States Air Force proposes to deploy an advanced, land-based mobile, intercontinental ballistic missile (ICBM) system known as M-X. This system will improve the nation's strategic deterrent force. In this regard, the Air Force is dedicated to meeting national defense goals while conserving natural and human resources. The purpose of this Environmental Impact Statement (EIS) is to document the analyses and studies performed to identify and compare potential impacts of proposed and alternative basing locations and identify the mitigations that are available. This EIS draft will be the basis for further public comment on the proposed project. A final EIS will be prepared in careful consideration of those comments and serve as an input to the decision process on a location for M-X deployment and withdrawal/acquisition of the land to base the system. The Bureau of Land Management, Department of the Interior, is a cooperating agency for this EIS. This EIS is the third in a series of four planned environmental impact statements for M-X. The first was an analysis of the buried trench construction test program (M-X: Buried Trench Construction and Test Program Final EIS). The second addressed full-scale engineering development decisions regarding missile design, basing mode selection, and a flight test program at Vandenberg Air Force Base, California (M-X: Milestone II Final EIS). That EIS was the basis for decisions on the basing mode. It analyzed vertical and horizontal shelters, slope-sided pool, 20-mile trench, and air mobile.

AD-A108 636/2 PC **A05**/MF **A01**
New York State Coll. of Agriculture and Life Sciences, Ithaca. Dept. of Agricultural Engineering.
Site Selection Methodology for the Land Treatment of Wastewater.
Special rept.,
John R. Ryan, and Raymond C. Loehr. Nov 81, 79p
CRREL-SR-81-28
Grant DACA89-78-G-006

A method is presented that covers facets of site selection from preliminary screening to field data acquisition for the preparation of a final design for a land treatment system. The basic assumption underlying the method is an approach to site selection in which the entire study area is investigated for potential sites while considering the whole spectrum of land treatment processes. Due to the extensive nature of such a study, several iterations are required to determine the most feasible site and land treatment alternatives. The method is presented in three parts. Level I defines the technical feasibility of implementing land treatment for a particular wastewater problem. The boundaries of the study area are defined and available land areas are rated for their suitability for land treatment based on topography, land use, hydrogeology and soil characteristics. A preliminary design for each suitable level I site candidate is prepared in the level II site analysis. The design is based on an evaluation of soil/waste interactions that considers responses to limiting soil conditions. A cost-effectiveness evaluation of waste treatment alternatives and site candidates is developed in level II. The most cost-effective site candidate is then selected for intensive level III field investigations. Data acquired in the level III field investigations will determine the design requirements of the land treatment system.

AD-A108 652/9 PC **A09**/MF **A01**
Corps of Engineers, Seattle, WA. Seattle District.
State of Washington, Aquatic Plant Management Program: Design Memorandum.
Oct 79, 184p

This design memorandum recommends a plan for the control of Eurasian watermilfoil, a nonnative aquatic plant, in the waters of Washington State. The plan was developed in response to a request from the State of Washington. Milfoil is presently a problem in several lakes, rivers, and reservoirs in eastern Washington and the Puget Sound area in western Washington. It has curtailed recreation activities in these areas and has the potential of decreasing water quality and impacting hydropower production, fish and wildlife, irrigated agriculture, and public health. In 1978, there were approximately 1,500 acres of navigable and nonnavigable waters with milfoil growth throughout the state. It is estimated that 113,000 acres of navigable waters could become infested within the next 15 years. The recommended plan consists of methods of prevention and control outlined in the report.

AD-A108 669/3 PC **A04**/MF **A01**
Owen (H. James), Palo Alto, CA.
Community Handbook on Flood Warning and Preparedness Programs.
Research rept.,
H. James Owen, and M. Wendell. Aug 81, 63p IWR-RR-81-R06

This report describes the activities, procedures, and other factors which make up a local flood warning and preparedness program. The program can be divided into four major elements: flood recognition system; warning arrangements; preparedness plan; and arrangements for maintenance of the program. The program is credited with saving scores of lives and preventing millions of dollars of damage. Successful implementation of flood warning systems may result in saving lives and reduction in flood damages. (Author)

AD-A108 671/9 PC **A05**/MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Cortlandt Lake Dam (Inventory Number N.Y. 85), Lower Hudson River Basin, Westchester County, New York. Phase I Inspection Report,
George Koch. 26 Aug 81, 91p
Contract DACW51-79-C-0001

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Visual inspection of this dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further engineering investigations and remedial work. The structural stability analysis performed for this report indicated that the stability of the spillway section of the dam is questionable. The analysis indicated that the dam was unstable for all conditions studied. The analysis performed was based on available information and assumptions made may not reflect actual conditions. However, the analysis does indicate that there are serious questions about the stability of this structure and further investigations are required. The inspection revealed a semicircular wet area just beyond the downstream end of the left windwall. There was active clear seepage in this area which had caused some sloughing. It is recommended that within 3 months of the date of notification of the owner, investigations into the structural stability and seepage problems on this dam be commenced. The structural stability investigations should include subsurface explorations and concrete cores to obtain information about the structure and its foundation conditions. This data should then be incorporated into a detailed stability evaluation and, if necessary, modifications to the structure should then be designed.

AD-A108 716/2 MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Bomb Crater Repair Techniques for Permanent Airfields. Report I. Series I Tests.
Technical rept. Jul-Nov 78,
David L. Cooksey. Oct 81, 129p Rept no. WES/MP/GL-81-12
Availability: Microfiche copies only.

A test section with six simulated bomb craters was constructed for the purpose of developing an improved field method of repair and restoration of air base runways damaged by enemy attack. The crater repair materials tested in the reconstruction were a high-quality crushed stone, grouted concrete, portland cement concrete (PCC), and asphaltic concrete (AC). The performances of the different materials were evaluated

under full-scale load testings with the F-4 and C-141 aircraft loadings. The gravity grout solution and the high-quality crushed stone method performed beyond required coverage levels and seem to be the two high candidate material systems for further research. The solutions were accomplished with the time, manpower, equipment, and performance constraints of operational requirements.

AD-A108 720/4 PC **A09**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Definition of an Improved Wet Support Bridge Concept and Related System Analysis.
Final rept. May-Oct 81,
Robert H. Bode, John S. Howland, George E. Pollak, and W. F. Reehl. Oct 81, 199p
Contract DAAK70-79-D-0036

This study presents key findings for the concept of an Improved Wet Support Bridge based on integral propulsion in all bays. It also provides a new concept for an integral propulsion bay for the existing Ribbon Bridge. The study concluded that a new half-width interior bay with integral propulsion in a single folding bow ponton is practicable for the existing Ribbon Bridge system and will improve bridge/rafting performance and reduce life cycle costs in comparison wth the Current Ribbon Bridge. It also concluded that the Improved Wet Bridge System based on integral propulsion in all three-ponton bays provides bridge/rafting capabilities for improved performance in handling Military Load Class 70. These new concepts will provide improved bridge/rafting performance throughout the 1980s and 1990s. (Author)

AD-A108 730/3 PC **A09**/MF **A01**
Pacific-Sierra Research Corp., Santa Monica, CA.
Analysis of Large Urban Fires.
Final rept. Sep 80-Sep 81,
R. D. Small, D. A. Larson, and H. L. Brode. Sep 81, 183p Rept no. PSR-1122
Contract EMW-C-0309

Large urban fires have resulted from natural disasters, explosions, and wartime actions. A single-megaton nuclear weapon can ignite hundreds of square kilometers. This report formulates a model that identifies several separate regions or components of such large area fires, and analyzes them individually. The conservation equations for a compressible flow are reduced, using asymptotic analysis, to simplified equation sets appropriate for each component region. Expansions are constructed using the burning-zone aspect ratio as the small parameter. The ongoing combustion processes are modeled by a spatially dependent volume heat source. The theory of large area fires thus developed is applicable to arbitrarily large fires and, in the lower limit, to scale fires the size of the multiple-fuelbed Flambeau experiments. The boundary value problem and solution algorithm for computation of the velocities and thermodynamic variables in and around the burning zone are detailed. Numerical results are given for the nominal case of a 10 km fire. The influence of radiation, turbulent diffusion of heat and momentum, and heat addition rate are explored and analyzed. The results show a large-velocity horizontal inflow being turned in the burning (heat addition) region to a vertical column flow, the convection column having a width comparable to that of the fire.

DOE/ET/10104-T10 PC **A10**/MF **A01**
Radian Corp., Austin, TX.
Remedial Measures Plan for a Spill of Solvent Refined Coal Liquid at the SRC Pilot Plant, Ft. Lewis, Washington. Final Report.
T. W. Grimshaw, and W. M. Little. 22 Aug 80, 207p
Contract AC01-76ET10104

On December 19, 1979, a spill of SRC liquid occurred during transfer of the liquid from a storage tank to sample drums. Approximately 2,300 gallons of fluid flowed into the floor of the tank farm and infiltrated into the porous and permeable gravels at the site. Because of concern for the possible impact of the SRC fluid on the quality of ground water, surface water, and water supply sources at and near the site, GMRC commissioned Radian to evaluate the problem and recommend specific measures to mitigate any known or anticipated impacts. This report presents the results of Radian's investigations. Although ground-water contamination apparently has occurred as a result of the December 19 spill, the contamination plume is localized to the vicinity of the SRC plant and Lake Sequalitchew. A contamination plume apparently is presently moving toward Lake Sequalitchew, but the two pump wells included in the Remedial Measures Plan will arrest this movement. These wells will be pumped until phenol concentrations in the groundwater fall to acceptable levels. The source of contamination at the spill is being cut off by excavation of the contaminated soil and sealing of the floor of the tank farm. No public water supplies are appreciably endangered by the December 19 spill. A long-term ground-water monitoring plan is being implemented to ensure early discovery of any unanticipated impacts of the spill. If further water quality problems are disclosed, additional remedial measures will be undertaken as necessary. (ERA citation 06:006892)

LA-8378 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Integrated Environmental Control Technology Approach to Oil Shale Commercialization.
E. J. Peterson, E. F. Thode, P. Wagner, and P. L. Wanek. Oct 80, 24p
Contract W-7405-ENG-36

A literature search was conducted to evaluate information about the chemistry, behavior, and distribution of environmentally hazardous water contaminants produced during extraction (above and below ground) and upgrading of shale oil, and to assess research in oil shale environmental control technology. This report details the literature pertinent to environmental control technology research. Air quality, water quality, potential surface disruption, and potential problem areas are assessed, research needs are identified, and where applicable, environmental control technologies and future research areas are indicated. (ERA citation 06:004544)

N82-13143/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Fuel-Air-Ratio Nonuniformity on Emissions of Nitrogen Oxides.
V. J. Lyons. Nov 81, 14p NASA-TP-1798, E-648

The inlet fuel-air ratio nonuniformity is studied to determine how nitrogen oxide (NOx) emissions are affected. An increase in NOx emissions with increased fuel-air ratio nonuniformity for average equivalence ratios less than 0.7 and a decrease in NOx emissions for average equivalence ratios near stoichiometric is predicted. The degree of uniformityy of fuel-air ratio profiles that is necessary to achieve NOx emissions goals for actual engines that use lean, premixed, prevaporized combustion systems is determined.

N82-13553/4 PC **A05**/MF **A01**
Finnish Meteorological Inst., Helsinki.
Sulfur in the Air in the Capital (Helsinki) Metropolitan Area: Itasat-Project Paeaekaupunkiseudun Ilman Rikki Itasat-Projektin Loppuraportti.
Final Report.
M. Wallin, E. Lumme, M. Hietamaeki, and E. Rantakrans. 1981, 86p RR-614.71
Text in Finnish.

Methods for regionally producing and processing information about air quality, air protection measures, and determining alternative examples for air protection solutions are assessed. The sulfur dioxide content of air is predicted. The effects of various air protection measures and their cost (flue gas desulfurization, use of low sulfur heavy fuel oil) are compared.

N82-13554/2 PC **A03**/MF **A01**
United Air Lines, Inc., San Francisco, CA. Maintenance Operations Center.
An Automated System for Global Atmospheric Sampling Using B-747 Airliners.
Final Report.
K. Q. Lew, U. R. C. Gustafsson, and R. E. Johnson. Oct 81, 31p NASA-CR-165264, UAL-C-80-31-33
Contract NAS3-17867

The global air sampling program utilizes commercial aircrafts in scheduled service to measure atmospheric constituents. A fully automated system designed for the 747 aircraft is described. Airline operational constraints and data and control subsystems are treated. The overall program management, system monitoring, and data retrieval from four aircraft in global service is described.

ORNL/TM-7152 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Overview of the Effects of the Coal Fuel Cycle on Hydrology, Water Quality and Use, and Aquatic Ecology.
R. M. Cushman, S. B. Gough, and M. S. Moran. May 80, 64p
Contract W-7405-ENG-26

Literature is summarized for the effects of the coal fuel cycle (mining, mine-site processing, transportation, storage, onsite processing, combustion, and waste collection and disposal) on water resources. Aspects considered include surface- and ground-water hydrology, water quality and use, and aquatic ecology. Water use is discussed with regard to both availability and water quality constraints on use. Requirements of the recently enacted Surface Mining Control and Reclamation Act are introduced where appropriate. For the combustion step in the fuel cycle, only those effects which are specific to coal as a fuel are addressed. Effects not specific to coal use (such as thermal effects, impingement, and entrainment resulting from cooling water withdrawal and use) are not considered. Reference is made to more exhaustive studies of the topics reviewed. A summary of the major environmental effects of the coal fuel cycle is given below. (ERA citation 05:025233)

ORNL/TM-7249 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Attenuation by Soils of Selected Potential Contaminants from Coal Conversion Facilities: A Literature Review.
E. K. Triegel. Aug 80, 53p
Contract W-7405-ENG-26

The proposed construction of coal conversion plants raises concerns regarding (1) the safe disposal of large quantities of solid waste generated by the technology and (2) the protection of the quality of groundwater. Soils are viewed as a means of attenuating contaminants, reducing the hazard of groundwater contamination, and also as a source of liner material for disposal areas. The purpose of this paper is to review the current literature to (1) identify those elements most likely to remain mobile in soils and (2) assess the relative importance of various soil properties in attenuating pollutants. Soil properties discussed in relationship to contaminant mobility are (1) surface area and the type and amount of clays present, (2) the amount of iron, aluminum, and manganese hydroxy oxides, (3) pH, (4) redox conditions, (5) organic matter content, and (6) the type and concentration of other ions or gases in the soil. The chemical behavior of the soil system is also affected by other factors that are dependent on the specific site and process. However, these are not discussed in detail in this paper. Several studies comparing the mobility of various trace elements and the behavior of different soil types are discussed. A more detailed analysis is given of the behavior of As, Ba, Cd, Cr, Cu, Co, Fe, Pb, Mn, Hg, Ni, polynuclear aromatic hydrocarbons, Se, Ag, and Zn. These species were chosen solely on the basis of primary or secondary drinking water standards and potential toxicity to aquatic life. The recommended standard, average background concentration in soils, and factors favoring mobility are given for each species. (ERA citation 05:033226)

ORNL-5655 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Dynamic Model of Power System Operation Incorporating Load Control.
M. A. Kuliasha. Oct 80, 161p
Contract W-7405-ENG-26

Load management has been proposed as a means whereby an electric utility can reduce its requirements for additional generation, transmission, and distribution investments, shift fuel dependency from limited to more abundant energy resources, and improve the efficiency of the electric energy system. There exist, however, serious technological and economic questions which must be answered to define the cost tradeoffs between initiating a load management strategy or adding additional capacity to meet the load. One aspect of this complex problem is to determine how the load profile might be modified by the load management option being considered. Towards this end, a model has been developed to determine how a power system with an active load control system should be operated to make the best use of its available resources. The model is capable of handling all types of conventional generating sources including thermal, hydro, and pumped storage units, and most appliances

being considered for direct control including those with inherent or designed storage characteristics. The model uses a dynamic programming technique to determine the optimal operating strategy for a given set of conditions. The use of the model is demonstrated. Case study results indicate that the production cost savings that can be achieved through the use of direct load control are highly dependent on utility characteristics, load characteristics, storage capacity, and penetration. The load characteristics that produce the greatest savings are: large storage capacity; high coincidence with the system peak; large connected load per point; and moderately high diversity fraction. (ERA citation 05:038246)

PAT-APPL-6-311 702 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Apparatus to Extract Dust and Fine Trash from Opened Cotton.
Patent Application,
Charles Shepard. Filed 15 Oct 81, 15p PB82-148537
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The instant invention relates to an apparatus for improving air quality. More specifically, the instant invention is an apparatus used to reduce fine trash and dust in a textile processing operation.

PB82-135765 PC **A04**/MF **A01**
Fish and Wildlife Service, Kearneysville, WV. Eastern Energy and Land Use Team.
Seven U.S. Fish and Wildlife Stream Channelization Studies.
Final rept.,
Norman G. Benson, and A. Stephen Weithman. May 80, 70p

This report synthesizes information developed in studies on the effects of stream channelization on fish and wildlife populations and habitats conducted in Iowa, Vermont, Montana, North Carolina, Ohio, Indiana, Wisconsin and Mississippi from 1973 to 1977. The studies were developed for use in impact assessment and for the development of mitigation methods. Major physical effects-of-channelization found were: decreases in sinuosity and stream length; increases in gradient and flow rates, and decreases in particle sizes in stream bottom substrates. Effects on macroinvertebrate abundance and diversity, fish numbers and biomass, mammal and bird populations, reptile and amphibian abundance and diversity are all discussed.

PB82-137787 PC **A09**/MF **A01**
Akron Univ., OH. Dept. of Civil Engineering.
Field and Laboratory Evaluation of Energy Dissipators for Culvert and Storm Drain Outlets. Volume I. Modular Energy Dissipators, Internal Energy Dissipators, Rock Channel Protection.
Final rept.,
S. Sarikelle, and A. L. Simon. Dec 80, 176p CEHY-80-2-VOL-1, FHWA/OH-79-03
See also Volume 2, PB82-137795. Sponsored in part by Ohio Dept. of Transportation, Columbus.

Results of a three part study related to the development and evaluation of precase modular and internal ring energy dissipators as well as riprap protection at culvert outlets are presented. Part 1 deals with the development of a modular energy dissipator for culvert outlets. Results from laboratory and field studies are detailed to show the performance of this type of dissipator at cantilevered and at grade outlets. Part 2 summarizes results obtained from studies related to the evaluation of internal energy dissipators. The study consisted of field instrumentation of a culvert fitted with peripheral roughness elements and measurement of flows. Part 3 describes studies that were undertaken to evaluate the performance of rock channel protection at culvert outlets. Field data was obtained from 400 culvert sites and coupled with statistical studies in evaluating rock protection schemes used for culvert outlet protection.

PB82-138520 CP **T08**
Environmental Protection Agency, Washington, DC. Facility Requirements Div.
CAPDET (Computer Assisted Procedures for the Design and Evaluation of Wastewater Treatment Systems).
Model-Simulation,
Sharie L. Tinkham, and Joyce Green. Feb 81, mag tape EPA/DF-81/008

Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

CAPDET program provides a state-of-the-art technique for screening wastewater treatment alternatives and for preliminary cost estimating and user charge assessment. Basic objective is providing a screening tool capable of simultaneously designing a number of wastewater treatment system alternatives meeting specified effluent criteria and subsequently ranking them on the basis of their present worth cost from lowest to highest. Conveyance costs are not considered...Software Description: The model is written in Fortran for implementation on an IBM 370/168 computer under OS/VS2.

PB82-139197 PC **A02**/MF **A01**
Public Technology, Inc., Washington, DC.
ROMA: Improving Refuse Collection Routes, Management Report.
1979, 11p NSF/RA-790750
Grant NSF-ISP79-10508

The ROMA computer package is a planning tool which aids sanitation managers and their staffs to plan daily refuse collection districts and routes which will result in more efficient use of manpower and equipment. It permits the simulated testing of contemplated policy changes to determine their likely impacts on work loads and refuse collection costs. Thus, managers of sanitation operations can assess several alternatives before implementing a decision. The ROMA package consists of computer programs, worksheets, data forms, and two publications--a project operations guide and this report. The guide contains detailed instructions on how to collect and prepare the data required by the ROMA computer programs. This report outlines briefly how the ROMA computer package can be used, and explains how to organize a project team for implementing ROMA. ROMA has been used successfully in the French cities of Bordeaux, Bourges, and a section of Paris. It has recently been used to develop daily refuse collection districts and routes in St. Petersburg, Florida.

PB82-140716 PC **A09**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Warfarin and Its Sodium Salt (3-(alpha-Acetonylbenzyl)-4-hydroxycoumarin): Pesticide Registration Standard.
Aug 81, 193p

This document contains information regarding reregistration of pesticide products containing Warfarin and its sodium salt, including how to register under a registration standard, regulatory position and rationale, and summaries of data requirements and data gaps. Also included is a bibliography containing citations of all studies reviewed by EPA in arriving at the positions and conclusions contained in the standard.

PB82-140963 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Environmental Effects of Traffic Changes,
A. M. Mackie, and C. H. Davies. c1981, 35p TRRL-LR-1015
Also pub. as ISSN-0305-1293.

The report describes a study of the environmental effects of traffic and traffic changes in nine towns where changes in traffic flow had occurred due to by-pass construction or traffic management schemes. An assessment of the nuisance caused by particular traffic flows has been made. The study also examined the effects of noise and air pollution on people's sensitivity to traffic. Nuisance was measured by means of personal interview surveys of people at home, pedestrians and people working in shops and offices. Nuisance levels changed considerably when the traffic levels changed. The single traffic variable most strongly correlated with nuisance was the number of lorries over 16 tons GVW, but there was also a high correlation between nuisance and total traffic flow. A multiple regression analysis showed that these two variables could explain 85 per cent of the variance in the nuisance data. (Copyright (c) Crown Copyright 1981.)

PB82-140989 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Role of Social Science Methodologies in Transport Planning,
L. Pickup, and S. W. Town. c1981, 27p TRRL-SUPPLEMENTARY-698
Also pub. as ISSN-0305-1315.

The report discusses the applications of social science in transport research and their potential within mainstream transport planning. Two distinct uses of social science are identified and discussed under the headings of social explanation and time-geographic explanation, referring to relevant empirical work undertaken. Social explanation consists both of descriptive social research and that which draws on sociological theory and concepts. Time-geographic explanations in contrast present a formal model of time and space constraints which map behavior patterns to show the range of activity and travel opportunity available to predefined social groups. Four types of time-geographic applications are discussed, studies based on diary surveys, interactive gaming approaches, time-geographic accessibility models and activity scheduling models. The report evaluates the use of these social science explanations for both model development and for a greater understanding of travel causes. Attention is drawn to the problems of applying social science in practical planning. To date its use has been for informing policy issues at a national level; scope is seen for developing simplified concepts that can be used at a local planning level. (Copyright (c) Crown Copyright 1981.)

PB82-141029 PC **A04**/MF **A01**
Urbitran Associates, Inc., New York.
Speed Control on High Speed Roadways.
Final rept.,
R. B. Lee, N. Bellizzi, and W. Allen. Mar 81, 75p FHWA/RD-81/096
Contract DOT-FH-11-9456

The objective of the study was to develop and evaluate novel pavement-marking treatments and delineation systems as potentially safe and effective means for controlling vehicle speeds on high-speed roadways. To develop and select candidate treatments for further testing, an exhaustive literature search was undertaken and discussions were held with traffic professionals. From questionnaire results, six (6) treatments were selected for further testing on a driving simulator. Objective and subjective data was collected. The subjective data generally bore out the results of the questionnaire surveys, in which some treatments had definite perceptional impacts on the drivers selection of speed. However, the objective data collected proved inconclusive.

PB82-141417 PC **A13**
Peat, Marwick, Mitchell and Co., Anchorage, AK.
Alaska OCS Socioeconomic Studies Program. Technical Report Number 62. Statewide and Regional Economic and Demographic Systems, Beaufort Sea (71) Impact Analysis.
Final rept.,
Will Nebesky, and Lee Huskey. Aug 81, 276p BLM/YK-TR-81/03
Contract DI-AA550-CT6-61
Prepared by Alaska Univ., Anchorage. Inst. of Social and Economic Research.

The study is concerned primarily with measuring the economic effects of the proposed Outer Continental Shelf (OCS) petroleum development in the Beaufort Sea (sale 71). The study includes a statewide and regional historic baseline analysis and base case projections against which the direct and indirect economic effects of Beaufort Sea OCS petroleum development are measured. The analysis and projections are carried out on a statewide level for selected regions within the state economy. The regions include Anchorage, Southcentral, Fairbanks, and North Slope regions of the Man-in-the-Arctic Program (MAP) models.

PB82-141763 PC **A02**/MF **A01**
Massachusetts Univ., Amherst. National Park Service Cooperative Research Unit.
Remonitoring of Province Lands Off-Road Vehicle Impact Sites.
Final rept.,
John M. B. Brodhead. 1979, 10p UM-NPSCRU-43
Contract NPS-CX-1600-8-0003

In September 1978, at the end of the Cape Cod growing season, all off-road vehicle impact and recovery plots in Cape Cod National Seashore were resampled,

some for the fifth consecutive year. This study of the effects of off-road vehicles on the dunes and marshes of the seashore, which began in 1974, is reported comprehensively in the final 'marsh' report. That report and the present one concern themselves with some aspects of the long-term recovery of plots impacted in 1974 as well as plots that showed evidence of chronic longterm impact and that were closed to further driving in order to determine their natural vegetation cover.

PB82-142050 PC **A08**/MF **A01**
GCA Corp., Chapel Hill, NC. GCA Technology Div.
Survey of Cadmium Emission Sources.
Sep 81, 163p EPA-450/3-81-013
Contract EPA/68-02-3168

This document presents technical data used to support decision making on the need for listing cadmium under Section 108(a)(1), Section 112(b)(1)(A), or Section 111(b)(1)(A) as required by Section 122 of the Clean Air Act, as amended in 1977. Data are presented describing potential sources of cadmium emissions, control techniques used for cadmium emission control, estimated controlled and uncontrolled cadmium emissions, estimated ambient air quality, and compliance status. The results of special dispersion modeling are presented for incineration, interaction of smelters, and for interaction of sources in the New York City - New Jersey area.

PB82-142308 PC **A10**/MF **A01**
Texas Transportation Inst., College Station.
Operational and Safety Effects of Driving on Paved Shoulders in Texas.
Final rept.,
Daniel B. Fambro, Daniel S. Turner, and Ramey O. Rogness. Jan 81, 218p TTI-2-18-79-265-2F, FHWA-TX-81/31-265-2F
Sponsored in part by Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div.

Paved shoulders in Texas are used by many drivers for making a large variety of traffic maneuvers and for satisfying numerous driving task demands. Unfortunately, there is little information as to the types and frequencies of this usage and the impacts and conditions under which they occur. This report documents research that was directed at providing answers to these questions. A combination questionnaire and personal interview technique was used to gain additional insight into this issue. The study also investigated driver preferences for and experiences with shoulder usage. Accident histories were determined for three different types of rural Texas highways - two-lane without paved shoulder roadways, two-lane with paved shoulder roadways and undivided four-lane without paved shoulder roadways. Data were collected on 21,000 vehicles at 18 different sites. Recommendations for more efficiently utilizing and controlling paved shoulder usage are presented.

PB82-142365 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Rail Transit and Terminals.
Transportation research record,
L. K. Edwards, Clark P. Turner, J. J. Bakker, Richard J. Scranton, and Stephen M. Stark. 1981, 57p TRB/TRR-817, ISBN-0-309-03258-X
Library of Congress catalog card no. 81-19031. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

Contents:
- Project 21--a practical new intermediate-capacity rapid transit system;
- Organizing for effective rail system planning and implementation--the Metro-Dade experience;
- Edmonton's light rail transit from concept to operations;
- Management decision model for light rail vehicle service--development and application;
- Second-generation UMTA transit station simulation model;
- Functional design elements for ferry terminals;
- Analysis of rapid transit access mode choice;
- Guidelines for planning public transportation terminals;
- Guidelines for allocating public transportation costs among towns in nonurbanized areas.

PB82-142902 PC **A14**/MF **A01**
Geological Survey, Oklahoma City, OK. Water Resources Div.
Water Type and Suitability of Oklahoma Surface Waters for Public Supply and Irrigation. Part 1: Arkansas River Mainstem and Verdigris, Neosho, and Illinois River Basins through 1978.
Final rept.,
Jerry D. Stoner. May 81, 305p USGS/WRI-81-33, USGS/WRD/WRI-81-100
Prepared in cooperation with Oklahoma Water Resources Board, Oklahoma City.

Water-quality data in the Arkansas River mainstem and the Verdigris, Neosho, and Illinois River basins are examined for water type and suitability for public water supply and for irrigation use. The classification of water type is based on the relation of the major ions -- calcium, magnesium, sodium, bicarbonate/carbonate, sulfate, and chloride -- to each other within the range of measured specific conductance. The evaluation of suitability for use as a public supply is based on the concentration levels and distribution of selected constituents.

PB82-143678 PC **A13**/MF **A01**
Technische Univ., Berlin (Germany, F.R.).
A Simulation Model for Measuring the Effectiveness of an Integrated Traffic Control System in Urban Networks (Simulationsmodell zur Bewertung einer Integrierten Verkehrslenkung in Stadtnetzen),
Klaus Leichter. 1981, 280p
Text in German.

The intent of this study is to develop a simulation model by means of which the traffic flow pattern of an urban road network can be duplicated in a computer. Control procedures are also considered which could be used in the context of an integrated traffic control system. The model enables the traffic engineer to measure the quality of a traffic flow pattern in terms of the cost effectiveness of various control devices. The model takes traffic lights, bus routes, parking and detours into account. A series of existing simulation models were evaluated for possible inclusion in an integrated traffic control system. In designing the computer program emphasis was given to the development of a data structure which would minimize storage space.

PB82-143769 PC **A08**/MF **A01**
Municipality of Metropolitan Seattle-METRO, WA.
The Metro Trolley Overhead Program, 1973 to 1981.
Final rept.,
Lynn L. Wilcox. Jun 81, 169p
Contracts DOT-WA-03-0016, DOT-WA-05-0010

On January 1, 1973, the Municipality of Metropolitan Seattle (Metro) took over operation of the City of Seattle's old 32-mile trolley overhead system. This report is a history of the program which rehabilitated this system and expanded it to 55 route miles. Administration, planning, designing and construction are discussed and final costs are presented.

PB82-143777 PC **A03**/MF **A01**
Federal Highway Administration, Washington, DC. Traffic Systems Div.
The Informational Load of Highway Guide Signs.
Final rept.,
Donald A. Gordon. Jul 81, 41p FHWA/RD-80/161

The report is concerned with the informational load of highway guide signs as indicated by the driver's response delays and faulty lane choices. Fifty experimental subjects individually viewed projected guide signs and after each presentation selected a highway lane leading to a preassigned destination. In one phase of the study, the assigned destination were on the signs; in another the destinations were not on the displays and subjects had to make navigational decisions relating sign information to what they knew about the routes. When subjects searched for destinations actually shown on the signs, lane selection was very rapid. The subject's search probably involved a scanning rather than a reading process. Search for route numbers was found to take longer than search for place names. Subjects required significantly more time to make a lane choice when a navigational decision was required than when the searched for destination was on the sign. Methods were suggested for reducing the informational load of signs.

PB82-143793 PC **A08**/MF **A01**
Environmental Protection Agency, Atlanta, GA. Region IV.
Mammoth Cave Area Wastewater Facilities, Kentucky.
Final environmental impact statement.
Aug 81, 157p EPA/904/9-81-076
See also report dated Apr 81, PB81-201097.

This Final Environmental Impact Statement addresses proposed wastewater facilities for the Mammoth Cave Area cities of Horse Cave, Cave City, Park City and Munfordville, Kentucky and the Mammoth Cave National Park. Eight wastewater management alternatives have been evaluated with particular attention to the sensitivity of the cave environment to wastewater discharges, the resource value and importance of the caves, the complexity of the area's subsurface hydrology and the financial impacts of the alternatives on the communities.

PB82-143868 PC **A03**/MF **A01**
Federal Highway Administration, Washington, DC. Traffic Systems Div.
The Legibility of Highway Guide Signs with Special Reference to Cardinal Direction Indications.
Final rept.,
Donald A. Gordon. Jun 81, 36p FHWA/RD-80/170

The report is concerned with the legibility of the message elements displayed on the highway guide signs. The work was carried out on a vision testing alley, using scaled down replicas of highway signs. Cardinal Direction indications (North, South, East, West) demonstrated satisfactory legibility. The findings indicate that route numbers had poorest legibility of the eight types of information displayed on the guide signs tested. They were seen at 10 percent shorter distance than place names.

PB82-143892 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Public Transport Supply in Indian Cities,
P. R. Fouracre, D. A. C. Maunder, M. G. Pathak, and C. H. Rao. c1981, 48p TRRL-LR-1018
Also pub. as ISSN-0305-1293.

This report presents a review of public transport supply in Indian cities. It is one of a series which presents the findings of the joint research project carried out over a two year period by the Indian Association of State Road Transport Undertakings (ASRTU) and the Transport and Road Research Laboratory(TRRL). Sources of information used were data published by the ASRTU and various transport undertakings together with results of surveys carried out in a number of cities. Comparisons are made of supply levels and output of the different modes involved in public transport. Some observations are made on efficiency of operations and on the effects of operating environment. (Copyright (c) Crown Copyright 1981.)

PB82-143900 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Transport Policies in Sri Lanka and Some Consequences,
A. J. Plumbe, and P. G. Hill. c1981, 21p TRRL-LR-1008
Also pub. as ISSN-0305-1293.

This report describes the repercussions which legislation designed to regulate the economy at large had on the national transport fleet of Sri Lanka. It comments on the lorry population, its distribution between economic sectors, and the relative productivity of each sector in the use of its vehicle fleet. (Copyright (c) Crown Copyright 1981.)

PB82-143918 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Role of the Agricultural Tractor in Road Haulage in Sri Lanka,
A. J. Plumbe, and H. M. Byrne. c1981, 21p TRRL-LR-1007
Also pub. as ISSN-0305-1293.

The agricultural tractor fills an important role in the freight haulage sector of the Sri Lankan economy. While some machines have been acquired by operators to use exclusively for this purpose, others are employed in this role only when not needed for soil cultivation. The report describes the geographical distribution of ownership, the scale of employment of tractors in this role and shows that before November 1977

road haulage was a profitable business for the owners of machines. After this date when the import of duty was substantially increased the report explains that the position was changed with owners of new machines being unlikely to cover their capital and running costs from revenue. (Copyright (c) Crown Copyright 1981.)

PB82-143926 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Bullock Cart Haulage in Sri Lanka,
A. J. Plumbe, and D. J. Savage. c1981, 23p TRRL-LR-1006
Also pub. as ISSN-0305-1293.

The characteristics of bullock cart haulage are described and the estimated profitability of operating bullock carts based on data collected from surveys conducted in 1977/78. The paper concludes that while the basic design of the bullock cart has changed little over time, and could well be improved, it is easily maintained and well suited to its role in satisfying the demand for goods transport at the most local level and in small unit loads. Details are given of the types and quantities of commodities carried and trip distances, speeds and tariffs are reported. (Copyright (c) Crown Copyright 1981.)

PB82-145228 PC **A03**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Coordination of Terminal Activities within a Transportation System (Samordning Mellom Transportkjede og Terminalfunksjon),
Tore Fossum. Dec 80, 50p ISBN-82-7133-337-2
Text in Norwegian.

The report shows how to use Critical Path Method network theory to point out the bottle-necks in the existing goods-transportation system, including harbor terminals. The flow of Information, Documents and Goods through the transportation system is analyzed. When all activities necessary to maintain this flow are on Critical Paths in the Network, the terminal activities are fully coordinated within the transportation system.

PB82-145277 PC **A05**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
A Description of Various Systems for Collection and Transportation of Solid Waste (Vurdering av Systemer for Innsamling og Transport av Avfall),
Robert Svendsen, and Bjoern Vold. Nov 80, 95p ISBN-82-7133-331-3
Text in Norwegian.

This report describes various systems for pre-collection, collection, transfer and transportation of solid waste. There is also given an example on how to calculate the total collection, transfer and transportation costs for a region.

PB82-145319 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
Land Use and Economic Development.
Transportation research record,
Douglass B. Lee, John W. Dickey, A. G. Hobeika, G. Budhu, and T. K. Tran. 1981, 42p TRB/TRR-820, ISBN-0-309-03261-X
Library of Congress catalog card no. 81-22412. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

Contents:
- Evaluation of economic and development impacts of major transit investments;
- Lessons from an economic analysis of an intercity road in a hypothetical developing country;
- System-dynamics approach to transportation planning in developing regions;
- Cross-impact analysis of proposed railway system;
- Forecasting economic and demographic change in slow-growth economy;
- Evaluation of two residential models for land use allocation.

PB82-145731 PC **A04**/MF **A01**
Vereinigte Aluminium-Werke A.G., Luenen (Germany, F.R.).
Development Projects for Solving the Red Mud Problem in the Aluminum Industry,
Gerhard Wargalla. 1980, 65p BMFT-FB-T-80-198
Trans. of mono. Entwicklungsprojekte zur Loesung des Rotschlammproblems der Aluminiumindustrie, Bonn, 89p Dec 80.

In the production of alumina from bauxite large quantities of a moist residue--so called red mud--are separated. Deposition of this material represents an increasing problem. Within the scope of the sponsored project possibilities of utilization of red mud were studied. By making use of a pilot spray-drier erected for this purpose, a filler was developed from red mud and put on the market for use in bituminous road-construction and in plastics. 600,000 sq m road surface with 2,500 t red mud filler have been constructed. The basic know-how for the production of lightweight aggregates from the tailings of coal dressing by addition of red mud was worked out. By recovery of valuable caustic soda from red mud a residue of low alkaline content was produced. Bricks of this material can be used as prefabricated steel works slag.

PB82-145830 PC **E07**/MF **E07**
Commission of the European Communities, Luxembourg.
Energy and Raw Material Saving Through Recycling of Plastics Materials Extracted from Urban Waste (Economie d'Energie et de Matiere Premiere Grace au Recyclage des Dechets de Matieres Plastiques Extraits des Ordures Urbaines).
Final rept.,
J. Michaux. c1980, 170p EUR-6917-FR
Text in French.Portions of this document are not fully legible.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The study is divided into 3 parts: Technical feasibility study, economic feasibility study, study of a factory handling 2,400 tons/year of plastics waste, and technico-economic feasibility study and market research, with an analysis of energy savings.

PB82-145855 PC **A04**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Kenya-Sudan Road Link: A Socio-Economic Study. Report I: Alignment - Water Supply - Places of Particular Value,
Marit Benterud, Vigdis Broch-Due, Kjell-Torgeir Skjetne, and Frode Storas. Apr 80, 74p ISBN-82-7133-307-0

The report is a socio-economic impact study of the Kenya-Sudan road link from Lodwar to Juba. It deals with local preferences for choice of route and preliminary appraisals for location of boreholes. Some places of particular value to the Turkana are mentioned. These places should not be violated neither by the road nor by its construction.

PB82-145863 PC **A05**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Improvement and Maintenance of Gravel Roads (Grusveger og Kjoeretoeyers Driftskostnader),
Nils Skarra, and Birgir Gudmundsson. Mar 81, 100p ISBN-82-7133-351-8
Text in Norwegian.

The report is based on a research of literature aimed at the establishment of criteria for the quality of gravel roads, considering both user and maintenance costs.

PB82-145889 PC **A05**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Truck Transportation Cost: 1977 (Lastebilkostnader 1977),
Olav Eidhammer, and Thor Svegarden. Oct 81, 76p ISBN-82-7133-373-9
Text in Norwegian.

The report is a study of the various costs in truck transportation. The total costs are divided into minor costs components and are calculated for a variable mileage per year independent of the truck size. Time dependent costs count for 75-80% of the total costs in relation to small trucks. As regards the trailers the time dependent costs count for roughly 55% of the total costs.

PB82-146184 PC **A02**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Center for Energy and Environmental Studies.
Multi-Objective Decision-Making for Environmental Regulations: Air Pollutant Emission Standards for Coal-Fired Boilers. Executive Summary,
David R. Lincoln, Nirmala Damodaran, Brad W. Crozier, and Edward S. Rubin. May 81, 18p NSF/PRA-81011
Grant NSF/PRA79-13069
See also PB82-146192.

This research examines alternative air emission standards for coal-fired boilers within a multi-objective decision framework. Interpollutant trade-offs were considered in a multi-media examination of environmental regulatory policy. The approach adopted was the development of a multi-objective framework linking an environmental assessment model with a quantitative human decisionmaking model for evaluating multi-media environmental impacts of coal-fired boilers. The assessment models employed computer simulation of alternate coal-to-electric and coal-to-steam boiler systems. Outcomes of the simulations were quantitatively described by resource requirements, costs, and multi-media environmental emissions. Pollution control technologies were presented for utility systems and industrial boilers. An interactive computer decision model (DECMOD) was developed to aid in the assessment of total social costs. Interview methods used to obtain information are described. Results of the study indicate that (1) it is possible to quantitatively model preferences for emission standards for coal-fired burners; and (2) preferences can be determined for a broad range of standards after obtaining responses to a relatively limited series of questions.

PB82-146192 PC **A11**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Center for Energy and Environmental Studies.
Multi-Objective Decision-Making for Environmental Regulations: Air Pollutant Emission Standards for Coal-Fired Boilers,
David R. Lincoln, Nirmala Damodaran, Brad W. Crozier, and Edward S. Rubin. May 81, 248p NSF/PRA-81012
Grant NSF-PRA79-13069
See also PB-146184.

Presented is a multi-objective framework which combines an environmental assessment model with a quantitative human decisionmaking model for evaluating multi-media environmental impacts of coal-fired boilers. The study demonstrates that such a framework can be developed and successfully implemented. Interactive computer models were developed to support the assessment. It also was demonstrated that technically knowledgeable people can respond to trade-off questions. Twenty-four respondents in the study found the multi-objective framework useful in exploring the implications of their perceptions of environmental impacts. Consistency checks in the decision model, DECMOD, were useful for exploring their judgments. With this framework, it was shown that it is possible to quantitatively model preferences for emission standards for coal-fired burners. Preferences can be determined for a road range of standards after obtaining responses to a relatively limited series of questions. The report describes the research model, coal-fired boiler systems, the multi-objective decision model, interview procedures, and preferred emission levels. An example of a site description document and the interview format for DECMOD are included in the appendices.

PB82-146317 PC **A05**/MF **A01**
Texas A and M Univ., College Station.
Small Business and Motor Carrier Regulatory Reform.
Final rept.,
Michael W. Pustay. 1 Sep 81, 100p
Contract SBA-2647-OA-79

This research explores the impact of U.S. Interstate Commerce Commission (ICC) regulation of the interstate motor carrier industry and recent reforms of ICC motor carrier regulation on the small business community. Three areas of major concern to the nation's small businesses are examined in depth: (1) Providing motor carrier service to small businesses located in small communities; (2) protecting small businessmen from the charging of discriminatory prices by ICC-regulated motor carriers; and (3) ensuring that small businesses have equal access to the services of contract carriers.

PB82-147273 PC **A04**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Kenya-Sudan Road Link. A Socio-Economic Study, Report 2: Organizing Roadworks - Social Aspects,
Dag Bjornland. Dec 80, 58p ISBN-82-7133-340-2
See also Report No. 3, PB82-147281. Sponsored in part by Norwegian Agency for International Development, Oslo.

This report is part of a socio-economic impact study of the Kenya-Sudan road link from Lodwar to Juba. It deals particularly with basic needs like the need for houses, sanitary facilities and services, shops, transport, social services for leisure time activities, job training, and the organizing of social activities. Locations of camps for road workers are also suggested.

PB82-147315 PC **A11**/MF **A01**
AeroVironment, Inc., Pasadena, CA.
Air Quality Maintenance Analysis in Phoenix, Arizona.
Final rept. Jul 77,
Michael W. Chan, Douglas W. Allard, and Sara J. Head. 11 May 77, 231p AV-FR-7029
Contract EPA-68-02-2349

This report presents results of an analysis for carbon monoxide and photochemical oxidants in the Phoenix Air Quality Maintenance Area. Eleven strategies were proposed for evaluation as to their effectiveness in attaining and maintaining the 8-hour CO and 1-hour oxidant standard. Three basic control strategies - traffic systems improvements, including highway construction, improved mass transit, including transit incentives, and regional development planning - are part of the ongoing planning process and, therefore, were assumed throughout the analysis. Two other control strategies - inspection/maintenance and carpooling - are already in operation but were evaluated in the same manner as the remaining six strategies. The six other strategies considered for inclusion in the Phoenix Air Quality Maintenance Plan were: periodic maintenance, vapor recovery, dealer emissions and driving schedule shifts. In 1990 and 1995, the three basic control strategies alone would be sufficient to attain and maintain the standard because of decreasing emissions due to stricter controls on automobile emissions. However, the reduction would not be adequate to maintain the standard in the year 2000 and there would again be exceedances.

PB82-147455 PC **A05**/MF **A01**
Iowa Inst. of Hydraulic Research, Iowa City.
Plume Configuration and Plume Recirculation/Interference of the Vienna Cooling Towers,
Subhash C. Jain, and John F. Kennedy. Dec 80, 94p IIHR-77, PPSP/JHU/PPSE-8-16

The objective of the laboratory model investigation reported herein was to study the behavior of the effluent plumes from the existing and proposed mechanical draft wet cooling towers at the Vienna power plant. Included in the study are plume recirculation and interference of the existing rectangular tower and the proposed round tower as well as effects on plume behavior of the power plant buildings and the coal pile. The study results can be utilized to determine the visible plume boundaries and cooling tower stack effluent concentration distributions for various meteorological and power plant operating conditions. The results can then be used to determine whether or not the plumes will cause fogging or icing on the proposed Route 50 bypass. Tests were conducted for several wind speeds and for the prevailing winter and summer wind directions.

PB82-147463 PC **A05**/MF **A01**
Iowa Inst. of Hydraulic Research, Iowa City.
Model Study of Plume Behavior for the Boiler Stack of Vienna Unit No. 8,
Subhash C. Jain, and John F. Kennedy. Apr 81, 84p IIHR-83, PPSP/JHU/PPSE-8-17

A laboratory model study was conducted to determine the plume behavior for the boiler stack of Vienna unit no. 8. A model with a scale of 1:50, consisting of the smokestack, and the plant buildings surrounding the smokestack, was tested. Tests were conducted for northwest and northeast wind directions and for several wind velocities. Data were collected by photographing the dyed plume and by measuring temperature distributions at three or more downwind sections. These model results can be used to validate and improve the analytic modeling techniques. The results indicate the plume downwash at high wind velocities.

PB82-147497 PC **A03**/MF **A01**
Minnesota Univ., Minneapolis. School of Public Health.
Water Quality Study - Southwest Minnesota Public Water Supplies,
Conrad P. Straub, Velta M. Goppers, and Rexford D. Singer. Mar 81, 27p W82-01795, OWRT-A-038-MINN(1)

Municipal water supplies in the Rock River watershed in Southeastern Minnesota were tested on a monthly basis for two years for the anions nitrate-nitrogen, sulfate, chloride, and bicarbonate alkalinity as CaCO3; and for total dissolved solids, conductivity, and pH. Ratios of the various anions were used to identify changes in water quality not associated with dilution. Seasonal changes in water quality were not necessarily reflected in changes of ratios; concentrations of nitrate-nitrogen increased in many cases, exceeding permissible concentrations specified in the Interim Primary Drinking Water Standards. Groundwater concentrations were compared with surface water samples from the several streams, springs, and lakes in the area, and some correlations were made between land use and groundwater quality and precipitation.

PB82-147844 PC **A07**/MF **A01**
Princeton Univ., NJ. Dept. of Civil Engineering.
Earthquake Induced Longitudinal Vibration in Earth Dams,
A. M. Abdel-Ghaffar. Dec 80, 135p 80-SM-14, NSF/RA-800625
Grant NSF-PFR78-22865

Two-dimensional analytical elastic models were developed for evaluating natural frequencies and modes of vibration of a wide class of earth dams in a direction parallel to the dam axis. The nonhomogeneity of the dam materials was considered as well as both shear and normal (axial) deviations. Dynamic properties of three real earth dams in Southern California estimated from their earthquake records and the dynamic test results of one dam, are compared with those from the suggested models. It was found that the models in which both the shear modulus and the modulus of elasticity of the dam material vary along the depth provide the most appropriate representations for predicting the dynamic characteristics. The theoretical results from some of the models compared favorably with the experimental and earthquake data. An analysis of real earthquake performance of an earth dam, in the longitudinal direction, yielded data on the shear moduli, damping factors, and nonlinear constitutive relations for the dam materials; Ramberg-Osgood nonlinear stress-strain curves were then fitted to these data. As a result of the study, a qualitative picture is presented of the distribution of dynamic strains and stresses within an earth dam during an earthquake.

PB82-147992 PC **A09**/MF **A01**
Cornell Univ., Ithaca, NY. School of Civil and Environmental Engineering.
Integration of Processes for Wastewater Residuals Management,
Richard I. Dick, and Yakir Hasit. May 81, 184p NSF/CEE-81065
Grant NSF-ENV77-22947

The manner in which municipal wastewater treatment plant sludge management processes interact with each other and with wastewater treatment processes is examined. The research includes experimental work to develop date on the effect of wastewater and sludge process design and operational procedures on the physical properties of sludges. These observations are incorporated into models of process performance. Costs for energy are extracted from each of the cost models to permit assessment of the implications of energy cost changes on wastewater and sludge management. The economic effects of sludge management are discussed in regard to gravity thickeners, mean cell residence time of the activated sludge process, sedimentation tank size, incineration, ocean disposal, mode of transportation, and electron radiation. Also included are descriptions of process performance models, cost models, and optimal process integration applications.

PB82-148297 PC **A04**/MF **A01**
Public Technology, Inc., Washington, DC.
Center City Environment and Transportation: Transportation Innovations in Five European Cities.
Final rept.
Apr 80, 59p DOT-I-80-29
See also PB-282 786.

This publication contains case studies, of five European cities which give a comparative analysis of their specific transportation situations downtown. Areas such as zoning, parking facilities, traffic signalization, integrated fare policies, bikeways, and payroll taxes are among topics covered.

PB82-148339 PC **A04**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Collection and Transportation of Source-Separated Waste from Households - An Introduction (Systemer for Oppsamling, Innsamling og Transport av Kildesortert Avfall - En Litteraturstuie),
Alf Lande. Nov 80, 61p ISBN-82-7133-330-5
Text in Norwegian.

This report is based on a study of articles and reports, and deals with collection and transportation of source-separated waste from households. It gives an introduction to some of the problems connected with source-separation in general. Some technical and organizing solutions are described, and costs from recycling programs are presented.

PB82-148347 PC **A04**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Use of Taxis for Transportation of Handicapped Persons (Taxi som Transporttilbud for Handikappede),
Kyrre Melchior. Mar 78, 63p ISBN-82-7133-213-9
Text in Norwegian.

The report highlights the use of taxis in transportation of disabled people. The report discusses in relation to individual resources and the environment the transportation of people with limited mobility using ordinary taxis.

PB82-148370 PC **A03**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Driving Speeds Near Schools - Effect of Time Controlled Variable Speed Limits (Kjoerefart ved Skoler - Effekt av Tidsbegrensede Fartsgrenseskilt),
Heert R. Daas, and Finn H. Amundsen. Sep 80, 44p ISBN-82-7133-322-4
Text in Norwegian.

In Norway many schools are situated along highways where the driving speeds are high. This is especially a problem at the opening time and closing time of the schools. This report deals with experiences with time controlled, variable speed limits. The results show that the speeds are greatly reduced by the speed limits and that even the portion of cars stopping to let children cross the roads are increased. Based on the results it is proposed to reduce the speed limits at schools where the driving speeds today are greater than 40 km/h in built up areas, and greater than 60 km/h in rural areas.

PB82-148396 PC **A11**/MF **A01**
Public Technology, Inc., Washington, DC.
Joint Development Marketplace: Proceedings of a Conference Held at Washington, DC. on June 25-27, 1978.
Jun 78, 230p DOT-I-80-3

The report is a record of the proceedings of a three day conference which covered many plans -- more than one hundred of them -- for enhancing the value of public transportation investments in cities through a private - public partnership. Topics included were speeches, developer perspective, Federal Perspective on joint development, and Mayor's perspectives on the move. A series of background papers is presented along with various issue papers, financial reports and outlines of workshops.

PB82-148685 PC **A07**/MF **A01**
Georgia Univ., Athens. Dept. of Political Science.
Mass Transit Management: Case Studies of the Metropolitan Atlanta Rapid Transit Authority.
Final rept. Mar 68,
Timothy A. Almy, Robert T. Golimbiewski, John Bates, Richard F. Perkins, and William B. Hildreth. Mar 81, 138p DOT-I-81-1

The report includes six case study reports on management oriented events and developments in the MARTA system. Topics covered include establishing goals for the transit system, economic and political ramifications of fare policy decisions, internal reorgani-

zations in MARTA, developing an arbitration process for resolving contractual disputes, and the role of marketing in the evolving system. The report should be of special use to transit planners and managers especially in larger transit properties.

PB82-148990 PC **A04**/MF **A01**
Public Technology, Inc., Washington, DC.
Transit System Productivity.
Information bulletin.
Jul 78, 57p IB/78-011
Sponsored in part by Department of Transportation, Washington, DC. Office of the Secretary.

This bulletin explores the subjects of transit productivity measurement and potential for productivity improvement. The following are discussed: (1) The concept of productivity; (2) Varying institutional perspectives; (3) Productivity indicators; (4) Labor productivity; (5) Service characteristics and pricing; and (6) Maintenance, organization, and procurement. There is a case study--Seattle's used by part-time bus drivers--which describes the potential of part-time labor for productivity improvement. A list of contacts and current programs is also included.

PB82-149014 PC **A02**/MF **A01**
Bureau of Reclamation, Amarillo, TX. Southwest Region.
Ojo Encino Study Area: Resource and Potential Reclamation Evaluation.
Summary 1978-81,
Dick Griese. Nov 81, 16p 19-78, BLM-YA-PT-81-010-3420
Sponsored in part by Geological Survey, Reston, VA.Color illustrations reproduced in black and white.

The report provides information on reclamation potential (and on coal resources) of 4,120-acre study area (SA) should coal development occur. The SA is located in McKinley County, New Mexico. The restoration of existing levels of vegetation is recommended. Irrigation required for 2 years. Forty-two percent of surface of the SA has suitable planting media. Many soils are saline or sodic. The bedrock is generally not a suitable planting media in the present state. Revegetation will be difficult because of low precipitation. Coal ranges from subbituminous to bituminous and beds average 6.3 feet in thickness.

PB82-149022 PC **A15**/MF **A01**
Bureau of Reclamation, Amarillo, TX. Southwest Region.
Ojo Encino Study Area: Resource and Potential Reclamation Evaluation.
Final rept. 1978-81,
Dick Griese. Nov 81, 344p 19-78, BLM-YA-PT-81-005-3420
Sponsored in part by Geological Survey, Reston, VA.

The report provides information on reclamation potential (and on coal resources) of 4,120-acre study area (SA) should coal development occur. The SA is located in McKinley County, New Mexico. The restoration of existing levels of vegetation is recommended. Forty-two percent of surface of the SA has a suitable planting media. Revegetation will be difficult because of low precipitation. Coal ranges from subbituminous to bituminous and beds average 6.3 feet in thickness. Considering geochemical factors, bedrock should not adversely affect ground water element concentrations. The SA has limited vegetative diversity. Hydrology or water quality considerations may pose problems for mining or reclamation.

PB82-149030 PC **A06**/MF **A01**
Woodward-Clyde Consultants, San Francisco, CA.
Study of the Factors Affecting the Safety of Arctic Pipelines.
Technical rept. (Final) 1979-1981,
W. T. Black, D. M. Holloway, U. Luscher, D. J. Nyman, and H. P. Thomas. Nov 81, 114p 14551A
Contract DOT-RL-92050

This report provides a detailed assessment of current practices employed in the design, construction, testing, inspection, operation, and maintenance of arctic pipelines which provide for safety to the public and protection of the environment. Existing research project pertaining to arctic pipelining problems are summarized. Hazards to pipelines that are unique to or accentuated by the arctic conditions are reviewed. A comparison is made between existing Canadian and U.S. regulations as they apply to arctic gas pipelines. The results of the study provide a basis for considering revisions to U.S. regulations for gas and liquid pipelines that may be applicable in arctic and subarctic areas. Recommendations are made for further research that is needed to enhance arctic pipeline safety.

PB82-149261 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
Economic Impacts of Transportation Restraints.
Information bulletin.
Sep 80, 39p DOT-I-80-39

This information bulletin addresses three major concerns expressed by local elected officials in cities and counties with populations of 500,000 or more. These concerns are related to the effects of traffic restrictions on local businesses, on an area's tax base, and on traffic and business. The information bulletin addresses these concerns by discussing the following issues: (1) The diversity of restrictions now in use in U.S. cities; (2) The known effects of transportation restrictions on economic, business, commercial, and or recreational activities; (3) Information gaps; and (4) The need for further work. This information bulletin also contains an annotated bibliography for future reference for the readers.

PB82-149279 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
Urban Goods Movement (Revised Edition).
Information bulletin.
Jan 80, 40p DOT-I-80-21
See also PB80-103146.

This bulletin covers the effect trucks and commodity shipments have on the community, particularly in the countries urban areas. Issues such as traffic congestion, damage to city streets, impact of hazardous materials carried by trucks, use of residential neighborhoods for through-truck movements are covered.

PB82-149949 PC **A04**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Future Directions for Transit Pricing: Proceedings of Conference on Transit Pricing Innovations Held at the National Academy of Sciences Study Center, Woods Hole, Massachusetts on September 3-5, 1980.
Final rept.,
C. Heaton, and H. Slavin. Apr 81, 52p DOT-TSC-UMTA-81-23, UMTA-MA-06-0049-81-8
See also PB82-149956 thru PB82-149998.

The purpose of the conference was to provide practical guidance to policy makers and transit operators on improved pricing policies and strategies. Topics covered include: trends and policies in future transit pricing; conventional and paratransit innovations; transit service characteristics; productivity and efficiency; transit service allocation through pricing mechanisms; philosophies of transit pricing. The workshops deal with transit pricing policies; implementation issues and the impact of price and service variations.

PB82-149956
(Order as PB82-149949, PC **A04**/MF **A02**)
Transportation Systems Center, Cambridge, MA.
Conference Summary: Future Directions for Transit Pricing,
Howard Slavin, and Carla Heaton. Apr 81, 5p
Included in Future Directions for Transit Pricing, p1-5 1981.

No abstract available.

PB82-149964
(Order as PB82-149949, PC **A04**/MF **A01**)
Urban Mass Transportation Administration, Washington, DC. Office of Service and Methods Demonstration.
Plenary Session Presentations,
Ronald J. Fisher, James Reading, Donald Mazziotti, Douglass Lee, and Philip Ringo. Apr 81, 19p
Sponsored in part by Transportation Systems Center, Cambridge, MA.
Included in Future Directions for Transit Pricing, p6-24 1981.

No abstract available.

PB82-149980
(Order as PB82-149949, PC **A04**/MF **A01**)
Ecosometrics, Inc., Bethesda, MD.
Implementation of Transit Fare Policies: Workshop II,
James Reading, Patricia Mayworm, Elizabeth Page, and Bruce Spear. Apr 81, 6p
Sponsored in part by Transportation Systems Center, Cambridge, MA. Prepared in cooperation with Central Ohio Transportation Authority.
Included in Future Directions for Transit Pricing, p31-36 1981.

No abstract available.

PB82-149998
(Order as PB82-149949, PC **A04**/MF **A01**)
New York State Dept. of Transportation, Albany.
Price and Service Variations: Workshop III,
David Hartgen, and Lawrence Doxsey. Apr 81, 8p
Sponsored in part by Transportation Systems Center, Washington, DC.
Included in Future Directions for Transit Pricing, p37-44 1981.

No abstract available.

PB82-150475 PC **A08**/MF **A01**
Transportation Research Board, Washington, DC.
Proceedings of the National Conference on Rural Public Transportation (4), Held in Vail, Colorado in June 1979,
Norman G. Paulius, Jr. Sep 79, 155p DOT-I-79-19
See also PB82-150483 thru PB82-150749.

The conference explored key issues of transit services to rural areas. Topics covered include managing state programs, local system management, coordination, brokerage, contracting for rural transportation services, and special concerns. A separate section summarizes the results of the 'Section 147 Rural Transit-Demonstration Program'.

PB82-150483
(Order as PB82-150475, PC **A08**/MF **A01**)
Pennsylvania Dept. of Transportation, Harrisburg.
State of the Art in Rural Public Transportation,
William Underwood, and Douglas McKelvey. Sep 79, 3p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary. Prepared in cooperation with National Transportation Policy Study Commission, Washington, DC.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p3-5 1979.

No abstract available.

PB82-150491
(Order as PB82-150475, PC **A08**/MF **A01**)
Ecosometrics, Inc., Bethesda, MD.
Results of the Section 147 Demonstration Program,
Jon E. Burkhardt. Sep 79, 6p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p6-11 1979.

No abstract available.

PB82-150509
(Order as PB82-150475, PC **A08**/MF **A01**)
Urban Inst., Washington, DC.
Organizational and Service Options for Public Transportation in Non-Urbanized Areas,
Ronald F. Kirby. Sep 79, 3p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p12-14 1979.

No abstract available.

PB82-150517
(Order as PB82-150475, PC **A08**/MF **A01**)
Ecosometrics, Inc., Bethesda, MD.
Planning Rural Transportation Systems: Lessons from the Section 147 Rural Public Highway Transportation Demonstration Program,
Jon E. Burkhardt. Sep 79, 5p

Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p15-19 1979.

No abstract available.

PB82-150525
(Order as PB82-150475, PC **A08**/MF **A01**)
Applied Resource Integration Ltd., Boston, MA.
Summary of Coordination Efforts in the Section 147 Rural Transportation Demonstration Program,
Norman Ketola, Carol Madsen, David Sampton, and Richard Stevens. Sep 79, 4p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p20-23 1979.

No abstract available.

PB82-150533
(Order as PB82-150475, PC **A08**/MF **A01**)
Federal Highway Administration, Washington, DC.
Service and Organizational Options in Rural Public Transportation: Lessons Learned from the Section 147 Demonstrations,
Raymond J. Benacquista, and Robert L. Smith, Jr. Sep 79, 3p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary. Prepared in cooperation with Wisconsin Univ.-Madison.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p24-26 1979.

No abstract available.

PB82-150558
(Order as PB82-150475, PC **A08**/MF **A01**)
Iowa Univ., Iowa City.
A Method for Distributing Federal Small Urban and Rural Transit Assistance at the State Level,
David J. Forkenbrock. Sep 79, 10p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p33-42 1979.

No abstract available.

PB82-150566
(Order as PB82-150475, PC **A08**/MF **A01**)
North Carolina Dept. of Transportation and Highway Safety, Raleigh.
Coordination at the State Level: Approaches and Importance,
Alice Garland, and Michael Eberlein. Sep 79, 6p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary. Prepared in cooperation with Michigan Dept. of State Highways and Transportation, Lansing.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p43-48 1979.

No abstract available.

PB82-150574
(Order as PB82-150475, PC **A08**/MF **A01**)
Crain and Associates, Menlo Park, CA.
Statewide Use of Discounted Transportation Tickets by the Transportation Disadvantaged in West Virginia, 1974-1979,
David A. Curry. Sep 79, 5p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p49-53 1979.

No abstract available.

PB82-150582
(Order as PB82-150475, PC **A08**/MF **A01**)
Florida State Dept. of Transportation, Tallahassee.
Florida's Approach to Transit Management,
W. W. Miller. Sep 79, 2p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p54-55 1979.

No abstract available.

PB82-150590
(Order as PB82-150475, PC **A08**/MF **A01**)
Iowa State Dept. of Transportation, Ames.
Public Transit Management/Technical Assistance in Iowa,
Franklin E. Sherkow. Sep 79, 5p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p56-60 1979.

No abstract available.

PB82-150608
(Order as PB82-150475, PC **A08**/MF **A01**)
Suwannee Valley Transit Authority, FL.
Developing and Managing a Rural Transit System: A Federal, State and Local Challenge,
Brad Vinson. Sep 79, 2p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p63-64 1979.

No abstract available.

PB82-150616
(Order as PB82-150475, PC **A08**/MF **A01**)
North Carolina Dept. of Transportation and Highway Safety, Raleigh.
The Transition from Specialized to Public Transportation,
Richard Garrity. Sep 79, 4p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p65-68 1979.

No abstract available.

PB82-150640
(Order as PB82-150475, PC **A08**/MF **A01**)
Applied Resource Integration Ltd., Boston, MA.
Assessing the Potential for Coordination,
Norman Ketola. Sep 79, 3p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p75-77 1979.

No abstract available.

PB82-150657
(Order as PB82-150475, PC **A08**/MF **A01**)
Ecosometrics, Inc., Bethesda, MD.
Coordinated Transportation Systems: Potential Costs and Benefits,
Jon E. Burkhardt. Sep 79, 4p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p78-81 1979.

No abstract available.

PB82-150665
(Order as PB82-150475, PC **A08**/MF **A01**)
Michigan Dept. of Transportation, Lansing.
Procedures and Progress Toward the Establishment of Uniform Accounting Capability in Jackson County, Michigan,
Rodney A Hunt. Sep 79, 6p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p82-87 1979.

No abstract available.

PB82-150673
(Order as PB82-150475, PC **A08**/MF **A01**)
Tennessee Univ., Knoxville.
Brokering Public Transportation Services in Non-urbanized and Rural Areas,
Ray A. Mundy. Sep 79, 3p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p91-83 1979.

No abstract available.

PB82-150707
(Order as PB82-150475, PC **A08**/MF **A01**)
Multisystems, Inc., Cambridge, MA.
Establishing a Contractual Framework for Delivery of Paratransit Services,
Keith W. Forstall, and David M. Alschuler. Sep 79, 7p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p105-111 1979.

No abstract available.

PB82-150715
(Order as PB82-150475, PC **A08**/MF **A01**)
Michigan Dept. of Transportation, Lansing.
Contracting with Private Intercity Carriers,
J. J. Rudnick, and Terrence Fritz. Sep 79, 3p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p112-114 1979.

No abstract available.

PB82-150723
(Order as PB82-150475, PC **A08**/MF **A01**)
Tennessee Univ., Knoxville.
Resolving the Human Service Insurance Dilemma,
Frank W. Davis, Jr., and Tim Cleary. Sep 79, 5p
Sponsored in part by Transportation Research Board, Washington, DC, and Department of Transportation, Washington, DC. Office of the Secretary.
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p117-121 1979.

No abstract available.

PB82-150731
(Order as PB82-150475, PC **A08**/MF **A01**)
Department of Labor, Washington, DC.
Application of Section 13 (C) Employee Protections to the Nonurban Transportation Program (Section 18),
Edward Weiss. Sep 79, 4p
Included in Proceedings of the National Conference on Rural Public Transportation (4th), p122-125 1979.

No abstract available.

PB82-151523 PC **A07**/MF **A01**
California State Univ., Long Beach.
Los Angeles County Transportation Commission Public Policy Impact Study (1977-1980).
Final rept. Sep 79-Aug 80,
Peter L. Shaw, and Renee Simon. Apr 81, 146p
UMTA-CA-11-0002-81-1

The report documents and analyzes activities of this new transportation agency from its inception in January 1977. The first year study examines the background and start-up period (1977-78); and the second year study (1978-79) examines the Los Angeles County Transportation Commission (LACTC) goal setting process, coordination of transit service, development of new systems, and intergovernmental entrepreneurship. The main focus of this report is on the third year of the study (1979-80) and it reviews (1) Los Angeles in perspective; (2) LACTC powers and activities, 1977-80; (3) Structural comparison of LACTC and other major urban transportation institutions; (4) Critical policy issues; (5) Public policy impacts in an era of declining resources.

PB82-803685 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hazardous Materials Transportation: General Studies. 1964-1976 (Citations from the NTIS Data Base).
Jan 82, 237p

The transportation of explosives, rocket propellants, pesticides, chemical warfare agents, industrial chemicals, liquefied natural gas, chlorine, and other hazardous materials is covered. All means of transportation are described. Accidents, injuries, explosions, and spills involving these materials are covered. Material testing and safety equipment are discussed. Economics and statistics of hazardous material transportation are included. Radioactive wastes and materials are excluded. (This updated bibliography contains 230 citations, none of which are new entries to the previous edition.)

PB82-803693 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hazardous Materials Transportation: General Studies. 1977-November, 1981 (Citations from the NTIS Data Base).
Jan 82, 173p
Supersedes PB80-813074, and NTIS/PS-79/0703.

The transportation of explosives, rocket propellants, pesticides, chemical warfare agents, industrial chemicals, liquefied natural gas, chlorine, and other hazardous materials is covered. All means of transportation are described. Accidents, injuries, explosions, and spills involving these materials are covered. Material testing and safety equipment are discussed. Economics and statistics of hazardous material transportation are included. Radioactive wastes and materials are excluded. (This updated bibliography contains 133 citations, 50 of which are new entries to the previous edition.)

PB82-803727 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solid Waste Reclamation and Recycling: Tires. 1964-December, 1981 (Citations from the NTIS Data Base).
Jan 82, 49p
Supersedes PB80-814593, and NTIS/PS-79/0831.

Methods of processing scrap tires, such as shredding, shearing, radiation treatment, retreading, hydrogenation, extraction, and emulsifying are cited. Incentives for recycling are examined and markets for recycled products are discussed. The use of recycled tires in highways, embankments, construction materials, and other products are covered. (This updated bibliography contains 41 citations, 4 of which are new entries to the previous edition.)

PB82-803735 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solid Waste Reclamation and Recycling: Paper. 1964-December, 1981 (Citations from the NTIS Data Base).
Jan 82, 169p
Supersedes PB80-814619, and NTIS/PS-79/0830.

Abstracts are presented on the reclamation and reuse of waste paper from municipal refuse, packaging, and newsprint. General planning, economics, legislation, and feasibility studies are included. Sorting equipment and techniques, reuse in construction materials, papermaking using recycled paper, pyrolysis to chemical compounds, and biodeterioration are covered. (This updated bibliography contains 162 citations, 7 of which are new entries to the previous edition.)

PB82-803750 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solid Waste Reclamation and Recycling: Metals. 1964-December, 1981 (Citations from the NTIS Data Base).
Jan 82, 336p
Supersedes PB80-814577, and NTIS/PS-79/0828.

Reports cited cover the following topics: Metal scrap refining and reuse, metal waste separation, the secondary metal industry, economic factors in metal recovery, junk car disposal, and metal recovery from urban refuse and industrial liquid waste streams. Studies on management planning, energy use, Government policies, and waste processing are also included. (This updated bibliography contains 329 citations, 21 of which are new entries to the previous edition.)

13C. Construction Equipment Materials, and Supplies

AD-A108 199/1 PC **A08**/MF **A01**
New Mexico Engineering Research Inst., Albuquerque.
Asphalt Recycling Technology: Literature Review and Research Plan.
Final rept. 30 Sep 80-15 Apr 81,
David E. Newcomb, and Jon A. Epps. Jun 81, 172p
NMERI-5.16-AP-40, AFESC/ESL-TR-81-42
Contract F29601-76-C-0015

A review of current technology for the rehabilitation and maintenance of pavement surfaces by recycling was conducted. While the primary concern was asphalt concrete recycling, a brief review of portland cement concrete recycling is included. Reports of cases involving recycling technology and lessons learned are reviewed. Recommendations are presented outlining research required to advance the state-of-the-art in a manner that will permit the U.S. Air Force to fully attain the benefits of recycling technology. (Author)

PAT-APPL-6-314 929 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Acoustic System for Material Transport.
Patent Application,
M. B. Barmatz, E. Trinh, T. G. Wang, D. D. Ellman, and N. Jacobi. Filed 26 Oct 81, 17p N82-12889/3, NASA-CASE-NPO-15453-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An object within a chamber is acoustically moved by applying wavelengths of different modes to the chamber to move the object between pressure wells formed by the modes. In one system, the object is placed in one end of the chamber while a resonant mode, applied along the length of the chamber, produces a pressure well at the location. The frequency is then switched to a second mode that produces a pressure well at the center of the chamber, to draw the object. When the object reaches the second pressure well and is still traveling towards the second end of the chamber, the acoustic frequency is again shifted to a third mode (which may equal the first mode) that has a pressure well in the second end portion of the chamber, to draw the object. A heat source may be located near the second end of the chamber to heat the sample, and after the sample is heated it can be cooled by moving it in a corresponding manner back to the first end of the chamber. The transducers for levitating and moving the object may be all located at the cool first end of the chamber.

13D. Containers and Packaging

PATENT-4 262 749 Not available NTIS
Department of the Army, Washington, DC.
Fire Suppression Bladder System for Fuel Tanks.
Patent,
Anthony J. Monte. Filed 20 Jun 79, patented 21 Apr 81, 6p AD-D009 020/9, PAT-APPL-6-050 403
Supersedes PAT-APPL-6-050 403.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Military vehicles equipped with upright fuel tanks are subject to near-explosion type fires when enemy projectiles pass through the tank. It is herein proposed to provide a source of pressurized fire suppressant near the fuel tank. Discharge of suppressant toward the emergent fireball is controlled by a squib valve that is triggered to the open condition by a pressure-responsive sensor mounted on the tank; the sensor responds to the shock wave generated by passage of the enemy projectile through the tank. Suppressant is directed toward the fireball by a bladder stretched across the inboard wall of the tank. Such a bladder advantageously has no metallic components that could fragment into dangerous lethal particles. (Author)

13E. Couplings, Fittings, Fasteners, and Joints

PATENT-4 266 591 Not available NTIS
Department of the Army, Washington, DC.
Locking Connector.
Patent,
Erwin F'Geppert. Filed 18 Jun 79, patented 12 May 81, 4p AD-D009 019/1, PAT-APPL-6-050 001
Supersedes PAT-APPL-6-050 001.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a locking connector that includes a shaft snugly fitting within circular openings in at least one of the two members to be connected together. The shaft carries a threaded pin that is eccentric to the shaft axis; a nut is threaded onto the pin to complete the locking connection between the two members.

PB82-134602 PC **A03**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
A First Report on Welding Diagrams,
M. F. Ashby, and K. E. Easterling. 1981, 40p CUED/C-MATS/TR-82-1981
Also pub. as ISSN-0309-6505. Prepared in cooperation with Lulea Univ. (Sweden).

Data for carbide dissolution and grain growth in the heat-affected zone of a weld can be assembled into a diagram showing the extent of each, for different weld cycles, and at different points in the zone. The diagrams are based on elementary kinetic models for grain growth and carbide dissolution, integrated over the weld cycle. The sets of poorly-known kinetic constants which appear in such a treatment are determined by fitting the equations to data from real or simulated welds, at certain fixed points. Diagrams are presented for six steels. As well as summarizing much data they allow the effect of change in weld procedure, or of preheat, to be predicted.

PB82-862111 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Anchor Bolts. 1970-January, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 82.
Jan 82, 189p
Supersedes PB80-808587.

Cited abstracts discuss anchor bolts, roof bolts or rock bolts as used mostly in mine and other underground operations. Bolt design and construction, hole drilling techniques, methods of bolt mounting, and measurements of installed bolt condition are described. Some citations treat non-mining rock bolt applications. (This updated bibliography contains 148 citations, 44 of which are new entries to the previous edition.)

PB82-862129 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Anchor Bolts. 1970-January, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 82.
Jan 82, 89p
Supersedes PB80-808595.

Cited reports discuss anchor bolts, roof bolts or rock bolts as used mostly in mine and other underground operations. Bolt design and construction, hole drilling techniques, methods of bolt mounting, and measurements of installed bolt condition are described. Some citations treat non-mining rock bolt applications. (This updated bibliography contains 89 citations, 18 of which are new entries to the previous edition.)

UCID-18813 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Microradiography of Electron Beam Braze Joins.
J. F. Shackelford. 24 Jul 80, 16p
Contract W-7405-ENG-48

Microradiography was used as one phase of a nondestructive evaluation program for inspection of the electron beam braze joining of dissimilar metals. Stainless steel tubing was joined to a gold-copper disk using a Cusil (copper/silver) brazing alloy. A 150-kV x-ray source was used with the radiographs recorded on

high-resolution plates. Interpretation of the radiographs was aided by computer graphics displays of digitized film density measurements. Braze intrusion maps were generated indicating the extent of braze penetration into the stainless steel tube. Penetration as small as a few micrometers was observable. (ERA citation 06:004055)

13F. Ground Transportation Equipment

AD-A108 737/8 PC **A07**/MF **A01**
RAND Corp., Santa Monica, CA.
Problems in Army Vehicle Maintenance: Results of a Questionnaire Survey.
Interim rept.,
C. R. Harz. Jun 81, 126p Rept no. RAND/R-2487-ARPA
Contract MDA903-78-C-0121

Results and comments of a survey of civilian and uniformed Army maintenance specialists on U.S. Army land vehicle maintenance problems. Responses to the survey indicate deep and serious problems in the Army maintenance system that hamper efficient operations and degrade combat readiness. There are shortages of qualified manpower, poor training and motivation of personnel, inadequate periodic/preventive maintenance of vehicles, lack of use of diagnostic equipment, misuse and abuse of vehicles, unreliable reporting of vehicle status information, and poor management and supervision of maintenance operations. These and other problems are discussed. Major findings of the survey are the dominance of manpower-related problems and the lack of reliable basic data on many facets of the maintenance system. (Author)

N82-13433/9 PC **A02**/MF **A01**
Valeo/Societe Anonyme Francaise du Ferodo. Direction des Etudes Centrales.
The Influence of High Temperature on Braking Influence de la Haute Temperature sur le Freinage.
1981, 21p
Text in French.

Temperatures encountered in brakes are cited, and the importance of the temperature factor to the behavior of brake materials is discussed. Macroscopic aspects of diminishing braking torque are described for certain thermic stages, i.e., failures known as 'low point' and 'fading'. The fundamental causes of these failures are analyzed, linking the thermomechanical properties of brake materials (rigidity and internal damping) to the amount of friction and to instantaneous fluctuations in the tangential force of friction. Results show the effect of a transfer film which forms in function of the thermal stage attained, the material composition, and of the nature of the brake surface.

N82-13506/2 PC **A14**/MF **A01**
Eaton Corp., Southfield, MI. Engineering and Research Center.
The AC Propulsion System for an Electric Vehicle, Phase 1.
Final Report.
S. Geppert. Aug 81, 307p NASA-CR-165480, DOE/NASA/0125-1
Contracts DEN3-125, DE-AI01-77CS-51044

A functional prototype of an electric vehicle ac propulsion system was built consisting of a 18.65 kW rated ac induction traction motor, pulse width modulated (PWM) transistorized inverter, two speed mechanically shifted automatic transmission, and an overall drive/vehicle controller. Design developmental steps, and test results of individual components and the complex system on an instrumented test frame are described. Computer models were developed for the inverter, motor and a representative vehicle. A preliminary reliability model and failure modes effects analysis are given.

N82-13510/4 PC **A08**/MF **A01**
Acurex Corp./Aerotherm, Mountain View, CA. Aerospace Systems Div.
Development of a High-Temperature Durable Catalyst for Use in Catalytic Combustors for Advanced Automotive Gas Turbine Engines.
Final Report.
H. Tong, G. C. Snow, E. K. Chu, R. L. S. Chang, and M. J. Angwin. Sep 81, 169p NASA-CR-165396, DOE/NASA/0083-1
Contracts DEN3-83, DE-AI01-77CS-51040

Durable catalytic reactors for advanced gas turbine engines were developed. Objectives were: to evaluate furnace aging as a cost effective catalytic reactor screening test, measure reactor degradation as a function of furnace aging, demonstrate 1,000 hours of combustion durability, and define a catalytic reactor system with a high probability of successful integration into an automotive gas turbine engine. Fourteen different catalytic reactor concepts were evaluated, leading to the selection of one for a durability combustion test with diesel fuel for combustion conditions. Eight additional catalytic reactors were evaluated and one of these was successfully combustion tested on propane fuel. This durability reactor used graded cell honeycombs and a combination of noble metal and metal oxide catalysts. The reactor was catalytically active and structurally sound at the end of the durability test.

N82-13837/1 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Berlin (Germany, F.R.).
The Influence of Pressure Waves on Measurements of High Speed Train Noise.
D. Bechert. Jul 80, 94p DFVLR-FB-81-06
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Pressure waves are studied experimentally and theoretically; their attenuation by high pass filters is calculated. Relative to an observer at rest, strong pressure fluctuations (pressure waves) are generated by high speed trains. Intensities are typically two orders of magnitude higher than those of radiated noise. Although this can cause problems when measuring noise close to the track, pressure waves can usually be filtered out as their major components are infrasonic. The analysis also includes effects due to vehicle shape and air compressibility. Examples are calculated and approximation formulas are given.

N82-13981/7 PC **A06**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Controlled Speed Accessory Drive Demonstration Program.
F. W. Hoehn. 15 Oct 81, 105p NASA-CR-165010, JPL-PUB-81-83
Contracts NAS7-100, DE-AI01-80CS-50194

A Controlled Speed Accessory Drive System was examined in an effort to improve the fuel economy of passenger cars. Concept feasibility and the performance of a typical system during actual road driving conditions were demonstrated. The CSAD system is described as a mechanical device which limits engine accessory speeds, thereby reducing parasitic horsepower losses and improving overall vehicle fuel economy. Fuel consumption data were compiled for fleets of GSA vehicles. Various motor pool locations were selected, each representing different climatic conditions. On the basis of a total accumulated fleet usage of nearly three million miles, an overall fuel economy improvement of 6 percent to 7 percent was demonstrated. Coincident chassis dynamometer tests were accomplished on selected vehicles to establish the effect of different accessory drive systems on exhaust emissions, and to evaluate the magnitude of the mileage benefits which could be derived.

PB82-137902 PC **A99**
Environmental Protection Agency, Washington, DC. Office of Noise Abatement and Control.
Official Docket for Proposed Revision to Rail Carrier Noise Emission Regulation: Part I.
Jul 79, 823p EPA-550/9-79-208-1
See also Part 2, PB82-137910.

This document, along with Parts II and III, provides copies of comments submitted to the public docket for the proposed revision to the rail carrier noise emission regulation. Copies of comments from State agencies, city/county governments, Federal agencies, private citizens, industry, and associations are provided. In total, 164 comments are presented in Parts I and II. Parts I and II make up one document of comments received during the official public comment period of April 17, 1979 until July 2, 1979. Comments received during the reopened public comment period, January 4, 1980 until April 4, 1980, are presented in Part III, a separate document.

PB82-137910 PC **A99**
Environmental Protection Agency, Washington, DC. Office of Noise Abatement and Control.
Official Docket for Proposed Revision to Rail Carrier Noise Emission Regulation: Part II.
Jul 79, 703p EPA-550/9-79-208-2
See also Part 1, PB82-137902, and Part 3, PB82-137928.

This document, along with Parts I and III, provides copies of comments submitted to the public docket for the proposed revision to the rail carrier noise emission regulation. Copies of comments from State agencies, city/county governments, Federal agencies, private citizens, industry, and associations are provided. In total, 164 comments are presented in Parts I and II. Parts I and II make up one document of comments received during the official public comment period of April 17, 1979 until July 2, 1979. Comments received during the reopened public comment period, January 4, 1980 until April 4, 1980, are presented in Part III, a separate document.

PB82-137928 PC **A11**
Environmental Protection Agency, Washington, DC. Office of Noise Abatement and Control.
Official Docket for Proposed Revision to Rail Carrier Noise Emission Regulation: Part III.
Jun 80, 232p EPA-550/9-80-215
See also Part 2, PB82-137910.

This document, along with Parts I and II, provides copies of comments submitted to the public docket for the proposed revision to the rail carrier noise emission regulation. Copies of comments received during the official public comment period, April 17, 1979 until July 2, 1979, are presented in Parts I and II. This document presents those comments received during the reopened public comment period of January 4, 1980 to April 4, 1980, and those comments received between July 2, 1979 and January 4, 1980. Comments presented here were received from State agencies, city/county governments, Federal agencies, private citizens, industry, and asssociations. In total, 38 comments are presented in this document.

PB82-141052 PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
Evaluation of Methods for Measurement of Longitudinal Rail Force in Unloaded Track.
Interim rept.,
T. E. Barber, R. C. Gertler, F. E. Dean, and H. D. Harrison. Sep 81, 51p FRA/ORD-81/65
Contract DOT-FR-9162

This evaluation of potential methods to measure the long-term variation of longitudinal rail force in unloaded track was conducted to identify a practical approach for application at the Facility for Accelerated Service Testing. Two measurement systems based upon strain gage bridge technology were selected and mounted on a short segment of rail, which was subjected to axial and eccentric mechanical loading and uniform and nonuniform thermal loading. While both systems were found to be capable of meeting the measurement requirements, one is recommended for ease of installation, data processing, and calibration. The system consists of a 4-arm bridge circuit of weldable strain gages, with individual gages mounted longitudinally and vertically on either side of the rail web at the neutral axis. This system was shown to be independent of rail bending and temperature effects within the requirements of the system.

PB82-142068 PC **A08**/MF **A01**
DSL Dynamic Sciences Ltd., St-Laurent (Quebec).
Curving Performance Analysis of Freight Car Trucks.
Final rept. Feb-Sep 81,
R. Young, and P. P. Marcotte. Sep 81, 170p 188-3, FRA/ORD-81/76, TDC/TP-3211E

A mathematical model of steady-state curve negotiation was used to simulate experimental curving tests of one conventional and six new concept railway freight car trucks. The report describes the model parameters used to characterize the trucks and test conditions. The experimental results from the Truck Design Optimization Project (TDOP) Phase II tests are compared to the model predictions of lateral wheel/rail forces and wheelset angles of attack. The model was also used to perform parameter sensitivity studies for each truck. The results from this work show that the model can predict trends in the steady-state curving of a

number of freight car trucks for a range of operating conditions, and can be used to determine the influence of parameter variations on truck curving performance.

PB82-145871 PC **A06**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Calculation Manual for Truck Transportation (Kalkylehandbok for Lastebildrift),
Thor Svegarden. Nov 81, 102p ISBN-82-7133-376-3
Text in Norwegian.

The calculation manual is treating various economic aspects of truck transportation. One aspect is to find the most suitable time to replace the old truck. It considers cost calculation under different working conditions. It also discusses the aspect of private versus rental fleet as well as various ways of financing the truck. Finally it teaches how to use the 'Cost Indices for Truck Transportation' published by the Norwegian institute.

PB82-146150 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Technology Indicators Based on Patent Data: The Case of Catalytic Converters. Phase I Report: Design and Demonstration,
R. S. Campbell, and A. L. Nieves. Sep 79, 168p
NSF/PRA-7820321
Grant NSF-PRA78-20321

The design and demonstration phase of a three-year study to develop and test various technological indicators is reported. These indicators are intended to provide information to policy makers regarding potentially important technological trends. The approach used is to extract data from individual United States patents in a homogeneous technological area. From this data, composite indicators that reflect the level of activity and the developmental stage of the technology are derived. The technology area covered in this phase is automotive catalytic converter technology from 1960-1978. The findings are described in four sections. Topics include patent filing distribution by year, general patent activity, citations and references, and complexity. Individual variables that were extracted or composite variables that were created tend to indicate that there were two growth periods. The last period has given way to a decline in the level of activity and an increase in concentration of activity. Included in the appendices are the original research tasks, the patent process, and patent data directory.

13G. Hydraulic and Pneumatic Equipment

AD-A108 230/4 PC **A06**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Annapolis, MD. Propulsion and Auxiliary Systems Dept.
Foundations for Computer Simulation of a Low Pressure Oil Flooded Single Screw Air Compressor.
Research and development rept.,
Thomas W. Bein. Dec 81, 122p Rept no. DTNSRDC/PAS-81/24

The necessary logic to construct a computer model to predict the performance of an oil flooded, single screw air compressor is developed. The geometric variables and relationships used to describe the general single screw mechanism are developed. The governing equations to describe the processes are developed from their primary relationships. The assumptions used in the development are also defined and justified. The computer model predicts the internal pressure, temperature, and flowrates through the leakage paths throughout the compression cycle of the single screw compressor. The model uses empirical external values as the basis for the internal predictions. The computer values are compared to the empirical values, and conclusions are drawn based on the results. Recommendations are made for future efforts to improve the computer model and to verify some of the conclusions that are drawn. (Author)

AD-A108 642/0 PC **A04**/MF **A01**
Iowa State Univ., Ames. Engineering Research Inst.
Prediction of Laminar-to-Turbulent Boundary Layer Transition in Axial-Flow Turbomachinery.
Interim rept. 1 Oct 80-30 Sep 81,
Charles E. Kluck. Sep 81, 73p ISU-ERI-AMES-82030, TCRL-21, AFOSR-TR-81-0806
Grant AFOSR-81-0004

This paper first reviews current analytical studies regarding the laminar-to-turbulent boundary layer transition process, including relevant analysis of laminar separation, and then covers analytical and experimental studies concerning parametric effects on transition pertinent to axial-flow turbomachine blade rows. These include the effects of pressure gradient, freestream turbulence, surface roughness, heat transfer, and combined effects. Finally, the work of various authors who have established data correlations for transition on axial-flow turbomachine blade rows is evaluated. Their predictive equations and charts have been presented as a reference guide for determining the transition region on blades. Additionally, equations for calculating transitional boundary layer growth are presented. (Author)

AD-A108 698/2 PC **A05**/MF **A01**
Oklahoma State Univ., Stillwater. Fluid Power Research Center.
Hydraulic System Acoustical Diagnostics.
Final technical rept. Sep 79-Aug 80,
Riichi Inoue, and R. K. King. Dec 80, 87p Rept no. OSU-FPRC-80-A-F1
Contract DAAK70-79-C-0139

This project is a continuation of previous acoustics studies conducted to determine if the vibration signature of hydraulic components could provide information concerning the operational health of the system. The concept of using internally produced noise to detect incipient failure is not new (the screwdriver-to-the-block trick used by automobile mechanics is a good example); however, the technique has been more of an art than a science, especially where hydraulic systems are concerned. This study advances the previous work by applying the concept to vane pumps into which specific known degradation has been introduced. The study showed that, by using case-mounted accelerometers, significant vibratory differences can be detected and associated with given conditions.

AD-A108 729/5 PC **A03**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Preliminary Design of a Hydraulic Power Supply for a Laminar Jet Angular Rate Sensor.
Contractor rept.,
T. R. Small, W. O. Wilkinson, F. F. Mark, and R. A. Makofski. Nov 81, 45p HDL-CR-80-384-2
Contract N00024-78-C-5384

The preliminary design of a hydraulic power supply for a laminar jet angular rate sensor is described. The requirements upon which this design was based are that the power supply provide stable pressure and flow rates (of the order of 10 psi and 1 l/min) over the military temperature range (-60 F to 180 F). Reliability, safety, small size, and low cost are also factors that were considered. State-of-the-art equipment and passive control are specified. Also presented are test plans for measuring the performance of the proposed power supply and a limited literature review of potential hydraulic fluids. (Author)

13H. Industrial Processes

GEPP-TIS-541 PC **A02**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Projection Welding for Cost Cutting.
F. Kuncz, Jr. 20 Nov 80, 16p
Contract AC04-76DP00656

Resistance projection welding is described pointing out the advantages, the machine requirements to be met, the suitability of various metals and/or metal combinations, the design considerations, the projection design requirements and their placement, and the limitations of this process. (ERA citation 06:003922)

PAT-APPL-6-300 839 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Dual Species Ion Implantation into GaAs.
Patent Application,
Yoon Soo Park. Filed 10 Sep 81, 26p AD-D009 039/9

Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The object of this invention is to provide a method of dual implantation with Ge and Ga or As into GaAs to provide low sheet conductivity and good mobility layers, good integrity of dopant profiles, good ohmic contacts, control of diffusion and enhancement of conductivity, and establishing post-implantation annealing conditions following ion implantation such as temperature, duration and encapsulants.

PB82-135906 PC **A03**/MF **A01**
Bureau of Mines, Rolla, MO. Rolla Research Center.
Consolidation of an Iron-Base Superalloy by Powder Metallurgy Techniques.
Rept. of investigations,
J. F. McIlwain, and L. A. Neumeier. Oct 81, 29p
BUMINES-RI-8556
Library of Congress catalog card no. 80-607851.

As part of its goal to minimize the requirements for critical materials, the Federal Bureau of Mines has investigated the consolidation of an iron-base superalloy (20 pct Cr, 5 pct each Ni and Mn, 1 pct each C, W, Mo, and Cb, and the balance Fe) and its modifications by powder metallurgy (P/M) techniques. Vacuum-atomized, prealloyed powder was used. Consolidation was by sintering of cold-pressed alloy powder, or by forging plus rolling or extrusion of canned powder. Several commercial lubricants were evaluated in the pressing operation.

PB82-139858 PC **A06**/MF **A01**
Universite de Valenciennes et du Hainaut Cambresis (France).
Automated Control and Order Generation in a Process of Exposure of Microcircuits Used in Acoustics or in Integral Optics (Commande Automatique et Generation des Consignes d'un Processus D'Insolation de Microcircuits Utilises en Acoustique ou en Optique Integree),
Patrick Millot. 21 Sep 79, 121p
Text in French.

Microelectronics, integral optics, and acoustics use complex circuit surfaces with dimensions of nearly one centimeter, achieved with a precision of approximately one micron and basically made up of geometric figures with rectilinear borders. Manufacture of these circuits requires the exposure of a sensitive resin layer placed on a substratum. The exposure can be produced by electronic or laser beam. Production, performance, and economic requirements led to the automation of the exposure devices and particularly the direction of the electronic or laser beam on the product to be exposed. Industrial microcalculators have become used. The present study concerns completion of a command system of a laser device to expose the circuits that can be used in integral optics and acoustics. The device conceived in this study permits the exposure by laser beam with any polygonal circuits on a surface of 8.192 x 8.192 sq mm using a microcalculator to direct the laser beam.

PB82-140153 PC **A04**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Computer-Assisted Circuit Design Masks for the Production of Microwave Circuits,
Jean-Luc Sedard. 1981, 57p CNES-NT-95
Trans. of mono. Conception de Circuits Assistee par Ordinateur Realisation de Masques pour l'elaboration de Circuits Micro-Ondes, n.p., n.d. See also French version N81-15197.

Microwave circuit masks are made using high-precision equipment which very often is not absolutely essential. In fact, lined width corresponding to a given impedance and line length corresponding to fractions of wavelengths are determined with an accuracy which is far lower than that of the apparatus used to produce the masks. From this standpoint, a computer and its graphical peripherals (cathode tracer COM 330) allow these difficulties to be overcome and a full scale mask to be produced directly on 35 mm film. These considerations are the basis of a study described in this note, including: (1) the production and control of the definition tests (line width, spacing); (2) the trace program versus user data; (3) applications and examples; (4) visualization.

PB82-142811 PC **A03**/MF **A01**
Electricity Council Research Centre, Capenhurst (England).
High Gradient Magnetic Separation Applied to Liquid-Liquid Separation,
A. P. King. Oct 81, 41p ECRC/R-1486

A state of the art report on de-emulsification by high gradient magnetic separation is presented. The factors affecting the design and performance of the magnetic separator cell are discussed. The limitations and potential of this technique are examined.

PB82-145822 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
Recrystallisation of Amorphous and Small Grain Size Polycrystalline Silicon.
Final rept.,
W. J. H. Schins, C. Daey Ouwens, J. Bezemer, and S. Radelaar. c1981, 28p EUR-7082-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The recrystallization of fine grained polycrystalline silicon obtained by chemical vapor deposition (C.V.D.) was investigated. C.V.D. grown polycrystalline silicon grains with sizes of 1-10 micrometers are either <110> textured or randomly oriented. Recrystallization of the highly textured material by heating for three hours at a few tenth of degrees below the melting point (1410C) yields a great variety in grain size in the range of 0.2 to 1.0 mm. No influence on grain growth of large temperature gradients (up to 500C/mm at 1300C) was observed. Silicon layers from an aluminum-silicon melt (25% silicon) have large grains of more than 1 mm diameter. Solar cells made of these layers behave like a short circuit until now. Purification of the silicon layers will improve solar cells made of them.

PB82-147810 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Coll. of Engineering.
Computer-Aided Injection Molding System.
Final rept.,
K. K. Wang, S. F. Shen, J. F. Stevenson, C. Cohen, and C. A. Hieber. Aug 81, 48p
Grant NSF-DAR74-11490
See also PB-288 283.

Results are presented of research undertaken to: (1) identify and solve rheological problems of injection molding; (2) develop numerical analysis techniques for simulating the injection molding process; (3) establish quantitative guidelines for mold design; (4) evaluate existing part descriptors for applications to mold design and manufacture; and (5) develop and implement an integrated computer aided design/manufacturing system as a prototype. It was found that mold filling can be scientifically predicted to an acceptable degree of accuracy for industrial applications not only for simple molds but also for industrial molds with fairly complex geometries. Sophisticated numerical schemes (finite difference, finite element, and a hybrid of the two) were developed to simulate molding dynamics. The feasibility of automating the mold design procedures through effective computer use was demonstrated.

PB82-148099 PC **A09**/MF **A01**
Bolt Beranek and Newman, Inc., Canoga Park, CA.
Industrial Machinery Noise Impact Modeling. Volume I,
C. H. Hansen, and B. A. Kugler. Jul 81, 191p BBN-4535-VOL-1, EPA-550/9-81/315
Contract EPA-68-01-5892
See also Volume 2, PB82-148107.

This study describes the development of a machinery noise computer model which may be used to assess the effect of occupational noise on the health and welfare of industrial workers. The purpose of the model is to provide EPA with the methodology to evaluate the personnel noise problem, to identify the equipment types responsible for the exposure and to assess the potential benefits of a given noise control action. Due to its flexibility in design and application, the model and supportive computer program can be used by other federal agencies, state governments, labor and industry as an aid in the development of noise abatement programs.

PB82-148107 PC **A22**/MF **A01**
Bolt Beranek and Newman, Inc., Canoga Park, CA.
Industrial Machinery Noise Impact Modeling. Volume II. Appendices,
B. A. Kugler, and C. H. Hansen. May 81, 513p BBN-4535-VOL-2
Contract EPA-68-01-5892
See also Volume 1, PB82-148099.Portions of this document are not fully legible.

The report presents the computer program developed to ascertain noise levels to which workers in foundries and sawmills are exposed. Output data from computer input are delineated.

PB82-149691 PC **E03**/MF **E03**
Commission of the European Communities, Luxembourg.
The Growth of Silicon Layers from the Vapour Phase on a Liquid Metal Layer.
Final rept.,
M. W. M. Graef, J. Bloem, L. J. Giling, H. G. W. Lensen, and J. W. C. Maes. c1981, 43p EUR-7080-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

A method was developed for growing large-grain polycrystalline silicon on a tin-coated graphite substrate (chemical vapor deposition on a liquid layer - CVDOLL process). The experimental conditions for optimum grain sizes were established; a study of the thermodynamics revealed the influence of gas phase composition and temperature on crystal surface morphology and average grain size. Some electrical properties of doped p-type layers grown on tin-coated graphite were measured. The results showed that p-type CVDOLL-grown silicon films are suitable as base layers in photovoltaic solar cells.

PB82-149709 PC **E02**/MF **E02**
Commission of the European Communities, Luxembourg.
Influence of Surface Structure and Surface Absorbates on Solid Phase Epitaxial Growth.
Final rept.,
J. Kistemaker, and F. W. Saris. c1981, 10p EUR-7092-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The epitaxial growth of layers of amorphous silicon up to thicknesses of 2500 A directly onto single crystals of silicon has been investigated in the solid phase (600C). In those samples in which epitaxial growth had not taken place with thermal annealing, success was achieved when annealing by pulsed laser was tried. This novel technique could reduce the production costs of solar cells as there is no need for a vacuum; nor is there any undesirable diffusion of dopant into the substrate when a p - n junction on semicrystalline silicon is formed.

PB82-803669 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Laser Cutting and Machining: Nonmetals. 1970-November, 1981 (Citations from the Engineering Index Data Base).
Jan 82, 166p
Supersedes PB80-814437, and NTIS/PS-79/0891.

Techniques for electrothermal cutting and machining of glass, fabrics, wood, plastics, and other nonmetal products by use of controlled laser beams are described in these reports gathered in worldwide literature surveys. Thermal analyses of materials exposed to laser beams are investigated. (This updated bibliography contains 159 citations, 20 of which are new entries to the previous edition.)

PB82-803677 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Laser Cutting and Machining: Metals. 1970-November, 1981 (Citations from the Engineering Index Data Base).
Jan 82, 358p
Supersedes PB80-814445, and NTIS/PS-79/0890.

Techniques for metalworking, machining, and cutting by use of controlled laser beams are investigated in these reports gathered in worldwide literature surveys. Precision finishing of metal surfaces is described. The thermal response of various metals is evaluated. (This updated bibliography contains 351 citations, 25 of which are new entries to the previous edition.)

PB82-860263 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Alloy Electrodeposition. 1970-January, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 82.
Jan 82, 257p
Supersedes PB81-852659.

The electrodeposition of alloys is disscussed. Operating parameters and electrolyte compositions for a wide variety of alloys are presented for decorative purposes, as well as corrosion and wear resistance, enhancement of magnetic properties and hardness. The use of additives such as surfactants to improve plating quality are also discussed, in addition to factors affecting stresses on the plate and substrate combination. (This updated bibliography contains 291 citations, 20 of which are new entries to the previous edition.)

PB82-861352 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Metallurgical Patenting of Steel Rods and Wire. 1966-January, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jan 82.
Jan 82, 118p

The patenting of steel wire and rods is discussed in the cited reports, in terms of heat treatment procedures. Emphasis is placed on improvement of physical properties as well as equipment for the patenting process. Continuous treatment procedures using fluidized beds are also considered. (Contains 198 citations fully indexed and includes a title list.)

PB82-862087 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Shot Cleaning and Blasting. 1970-January, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 82.
Jan 82, 68p
Supersedes PB80-809254.

This bibliography covers abrasive cleaning, blasting and machining, shot blasting and cleaning, and blast cleaning. Materials cleaned include metals, plastics, ceramics, road surfaces, and marine equipment. The advantages, disadvantages, and techniques used for these cleaning methods are delineated. (This updated bibliography contains 44 citations, 7 of which are new entries to the previous edition.)

13I. Machinery and Tools

N82-13428/9 PC **A02**/MF **A01**
Battelle Columbus Labs., OH.
Study of Methods for Applying and Enhancing Transfer Film Coatings of Polytetrafluoroethylene (PTEE) to Space Shuttle Main Engine (SSME) High Pressure Oxygen Turbo Pump (HPOTP) Bearings.
Final Report.
J. W. Kannel, K. F. Dufrane, and F. F. Zugaro. 25 Nov 81, 19p NASA-CR-161916
Contract NAS8-33576

Machines were constructed and evaluated for burnishing polytetrafluoroethylene on balls for use in the high pressure oxygen turbopump (HPOTP). The most positive performance was obtained with single-ball burnishing, but one technique for burnishing three balls simultaneously holds promise. Evaluations of the coatings in a HPOTP bearing of earlier design (employed smaller diameter balls) showed very little life enhancement before high torque and ball and race wear initiated. Other coating techniques, such as molybdenum disulfide combined with PTFE transfer films, hold promise for providing the more durable quantities of solid lubricant needed for the bearings.

PATENT-4 286 542 Not available NTIS
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.

Liquid Immersion Apparatus for Minute Articles.
Patent,
J. G. Belcher, Jr., and B. R. Hollis, Jr. Filed 18 Jul 80, patented 1 Sep 81, 4p N82-12441/3, PAT-APPL-6-171 933
Supersedes PAT-APPL-6-171 933, N80-32585 (18 - 23, p 3121).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Apparatus is disclosed for immersing minute integrated circuit chips in an etching solution in manufacturing integrated circuits during research and development. The apparatus includes a holder, having a handle and basket support for carrying a removable unitary basket and lid structure where fluid flow-through passages are formed, and wherein graduated openings in the handle provide for adjustably supporting the basket in a breaker at a desired level.

PATENT-4 291 454 Not available NTIS
Department of the Navy, Washington, DC.
Rubber Boot Expander.
Patent,
John Sawaryn. Filed 4 Sep 79, patented 29 Sep 81, 5p AD-D009 023/3, PAT-APPL-6-071 886
Supersedes PAT-APPL-6-071 886, AD-D006 955.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The expander system is utilized for installation and removal of a rubber boot over an underwater transducer. The installation system comprises a vacuum tank, adjusting sleeves, boot spreader and C clamps. The rubber boot is expanded at both ends by means of the boot spreader and then is expanded along its sidewall in a radial direction by means of a differential pressure created by pulling a vacuum on the outside surface of the rubber boot. The boot is then slipped on the transducer. For removal of the boot a short handled hook tool is used in place of the boot spreader. The method again includes pulling a vacuum on the outside surface of the rubber boot so the boot expands enabling the removal of the transducer. (Author)

PB82-145251 PC **A03**/MF **A01**
Norsk Treteknisk Inst., Oslo.
Sawblade Guides (Sagbladstyringer),
Sindre Holoeyen. Oct 77, 34p MEDDELELSE-55, ISBN-82-7120-015-1
Text in Norwegian, summary in English.

The circular sawblade guides used in Scandinavia today are either circular pins or rectangular blocks, and they act as side stops for the sawblade when it oscillates transversely. The ideal sawblade guides will give transverse support and vibration damping of the sawblade. Plane, circular sawblade guides exerting up to 180 kg pressure against each sawblade side without disturbing the operation of the saw have been developed. Compressed air is used to create strong air films between the saw guides and the saw surfaces. Air consumption is rather large. It is physically possible to use saw guides which continuously exert transverse supporting forces on the saw. Such saw guides are likely to cause some friction heating of the sawblade, and they should therefore only be used in connection with a sawblade temperature control system.

PB82-145269 PC **A05**/MF **A01**
Norsk Treteknisk Inst., Oslo.
Feedback Control of Sawblade Temperature with Induction Heating (Kontroll av Temperaturen i Sirkelsagblad med Tilbakekopling for Styring av Temperaturfordelingen med Induktiv HF-Oppvarming),
C. D. Mote, Jr., and S. Holoeyen. Oct 77, 82p MEDDELELSE-56, ISBN-82-7120-017-8
Text in English, summary in Norwegian.

The temperature distribution in a circular saw is controlled during laboratory and production experiments by induction heating. Transient heating, transient cooling and steady state, feed back controlled, temperature distributions were recorded. An infrared temperature sensor was designed and built to measure the blade temperature at radii of the saw and the controller maintained a steady state temperature set point to less than 2C variation. Theoretical and supporting experimental analyses of the fundamental coil design used in the cutting experiments are also presented.

PB82-860495 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Gear Design and Testing. 1972-January, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Jan 82.
Jan 82, 152p
Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

The bibliography contains abstracts of reports relevant to the design and testing of a wide variety of gears and gear assemblies. The analysis of gearing and gearbox design is featured. Wear life and vibration control are also discussed. Methods for testing gear materials for wear resistance and structural stability are included. Gearing design of power transmissions for turbine and helicopter engines is included. (Contains 149 citations fully indexed and includes a title list.)

PB82-860503 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Gear Design and Testing. 1970-January, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 82.
Jan 82, 239p

The bibliography contains abstracts of reports relevant to the design and testing of a wide variety of gears and gear assemblies. Topics include the effect of design criteria on gear wear and fatigue, lubricants, inspection procedures, methods of manufacture and material selection. Emphasis is placed on helicoptor and turbine engines. (Contains 199 citations fully indexed and includes a title list.)

PB82-861451 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Industrial Robots and Teleoperators. June, 1970-January, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jan 82.
Jan 82, 212p
Supersedes PB80-851132.

The use of computer controlled industrial robots and teleoperators is presented. Applications include welding, metal cutting, forging, and painting. The assessment of robots with respect to labor-management relations is also discussed. (This updated bibliography contains 259 citations, 59 of which are new entries to the previous edition.)

PNL-3446 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Prototype Arc Saw Design and Cutting Trials.
G. S. Allison. Sep 80, 34p
Contract AC06-76RL01830

A program was initiated to develop the arc saw as a tool capable of removing the end fittings from spent nuclear fuel bundles. A special arc saw for this purpose was designed, installed at the Pacific Northwest Laboratory and satisfactorily operated to remove end fittings from simulated, nonradioactive fuel bundles. The design of the arc saw included consideration of the cutting environment, power supply size, control equipment, and work piece size. Several simulated fuel bundles were cut to demonstrate that the arc saw met design specifications. Although the arc saw development program was curtailed before significant performance data could be collected, tests indicate that the arc saw is a good means of cropping spent fuel bundles and is well suited to remote operation and maintenance. (ERA citation 05:037702)

UCRL-52960(Sup.1) PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Technology of Machine Tools. Supplement 1. Testing of Accuracy of NC Machine Tools.
J. Tlusty. Oct 80, 95p
Contract W-7405-ENG-48

The state of the art of accuracy testing, a concept, basic explanations, definitions, methods, and a list of tests are presented here as a general proposal for a standard test that corresponds to the present state of the art of metrology of numerically controlled machine tools. The three main basic features of this system are: it is a non-machining system of tests which could be called tracing of a universal master part; it is an essentially non-statistical test which assumes that the individual sources of errors and their motions can be, to a reasonable extent, isolated and systematically combined; and the tests are formulated from the user's and not from the builder's point of view, and they are related to the accuracy of the workpiece. The basic measurements of translational and rotational errors, the effects of machine deformation and of temperature, and the tolerances permitted in milling, boring, and turning machine operations are discussed. (ERA citation 06:005162)

13J. Marine Engineering

AD-A108 429/2 PC **A10**/MF **A01**
Hydronautics, Inc., Laurel, MD.
Experimental and Theoretical Investigation of Factors Affecting Fin-Body Interference.
Final technical rept.,
Alex Goodman. Aug 80, 207p Rept no. TR-7927-1
Contract N00167-79-C-0093

A comprehensive series of wind-tunnel experiments were conducted to determine the static-lateral stability characteristics of a systematic series of submarine-type fin-body combinations. The effects of body-boundary layer and sidewash, fin-aspect ratio, fin-taper ratio, and diameter-span ratio on the total forces and moments of the fin-body combinations as well as on the fins in the presence of the bodies were evaluated. Measurements were also made to define the body boundary layer and sidewash in the vicinity occupied by the fins. Visualization of the flow behind the body and body-fairwater combination was observed by means of a tuft grid. The results of the investigation are presented in the form of plots and tabulations of the nondimensional force and moment coefficients, static stability derivatives and mutual interference factors. Also, comparisons of the results are made with theory and calculations based on a modified lifting surface method. (Author)

AD-A108 574/5 PC **A04**/MF **A01**
Public Research Inst., Alexandria, VA.
Overhaul Costs in Public and Private Shipyards: A Case Study,
Marianne Bowes. Oct 81, 53p Rept no. CRC-442-REV
Contract N00014-79-C-0448

This study investigated whether overhaul costs differ in public and private shipyards, using data on overhauls of the Sturgeon class of nuclear attack submarines between 1971 and 1979. We began by estimating a cost function and using the regression coefficients to estimate the production cost of a hypothetical overhaul for each shipyard in each year. For the most part, it was found that estimated naval shipyard costs did not differ significantly from estimated private yard costs. There were, however, several instances in which naval yard costs were significantly higher than private yard costs. Among the reasons for the differences in estimated production costs in our sample were higher wage rates and a lower cost of capital in the naval shipyards. Experience levels also differed among shipyards, but were not consistently higher or lower for the naval shipyards. There may be a difference in overhaul quality, but such a difference did not show up in the measures of material condition that we examined. One difference that did emerge strongly concerned the length of time per overhaul, which was lower in the naval shipyards.

AD-A108 609/9 PC **A04**/MF **A01**
SRI International, Arlington, VA.
Drag Reduction and Adaptive Boundary Conditions.
Technical rept.,
C. Callan, and K. Case. Nov 81, 63p Rept no. SRI-JSR-81-17
Contract MDA903-78-C-0086, ARPA Order-2504

This report considers the problem of increasing the maximum speed at which the boundary layer of a body in water can remain in laminar flow. It is shown that substantial improvement can be made by modifying the boundary conditions of the linear stability problem. The concern of affecting the turbulence itself to reduce drag is not addressed. (Author)

AD-A108 715/4 PC **A03**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
The Complex Vibrations and Implied Drag of a Long Oceanographic Wire in Cross-Flow.
Summary rept.,
C. M. Alexander. 1981, 32p Rept no. MPL-U-17/79
Contracts N00014-75-C-0749, N00014-69-A-0200-6051
Pub. in Ocean Engineering, v8 n4 p379-406 1981.
Sponsored in part by Contract N6631 I-74-C-8015.
Doctoral thesis.

No abstract available.

N82-13455/2 PC **A08**/MF **A01**
Hamburg Univ. (Germany, F.R.). Inst. fuer Schiffbau
Behavior of Plane Panels in Ship Structures with Local Initial Deflections Tragfaehigkeit von E Benen Schiffbaulichen Flaechentragwerken MIT Oertlichen Vorverformungen.
H. Petershagen. 1980, 156p BMVG-FBWT-80-18
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

The influence of deformations resulting from welding stresses on the carrying capacity of plate panels were studied theoretically and experimentally. Buckling tests were made with two longitudinally and transversally stiffened plates under longitudinal compression combined with inplane shear and lateral load. The test results are compared with the predictions from nonlinear plate theory. The theoretical stress analysis is based on a model: one involving application of the energy method, and a model using finite element techniques. Results show that the initial deformations affined to the buckling modes have the greatest influence. The finite element idealizations do not lead to improvements as compared to the results from the energy method.

PB82-860446 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Diesel and Gas Turbine Marine Engine Alternatives. 1976-January, 1982 (Citations from Information Services in Mechanical Engineering Data Base).
Rept. for 1976-Jan 82.
Jan 82, 145p
Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

Reports are cited which discuss the development and utilization of power plants designed for marine use. Power generated by coal burning, wind, nuclear reactors, water jet propulsion, and high-power water-cooled electric propulsion are among the alternative sources of power for marine application. Performance evaluations of existing unconventional marine propulsion systems are examined. This bibliography does not consider diesel internal combustion or gas turbine marine engines. (Contains 207 citations fully indexed and includes a title list.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

DOE/MC/14522-1 PC **A13**/MF **A01**
TRW Energy Systems Group, Morgantown, WV.
Proceedings of the 2ND Symposium on Valves for Coal Conversion and Utilization.
D. A. Maxfield. Jan 81, 279p CONF-8010171-
Contract AM21-80MC14522
Symposium on valves for coal conversion and utilization, Morgantown, WV, USA, 15 Oct 1980.

The 2nd symposium on valves for coal conversion and utilization was held October 15 to 17, 1980. It was sponsored by the US Department of Energy, Morgantown Energy Technology Center, in cooperation with the Valve Manufacturers Association. Seventeen papers have been entered individually into EDB and ERA. (ERA citation 06:016357)

SAN-1890-1 PC **A05**/MF **A01**
Systems Exploration, Inc., San Diego, CA.
Investigation of a Solar Thermal Powered Pump for Agricultural Application. Final Report.
D. E. Calkins, T. L. Keenan, and E. R. Bate. Sep 78, 90p
Contract ET-78-C-03-1890

A simple solar thermal powered water raising device, for irrigation applications, has been investigated. The concept is based on the use of a closed piston system comprising a condensable working fluid and an array of solar collector panels in conjunction with a mechanical system comprising a cable, lever, pulley and water bucket. The alternate heating and cooling of the solar panels in turn evaporates (expands) and condenses (contracts) the working fluid thereby moving the piston in a vertical direction. This vertical movement is transmitted through the cable, lever and pulley assembly to a vertical movement of a second cable which raises a bucket of water, dumps it on the solar panel thus cooling it and allowing the bucket to lower back to the water, where the cycle begins again. A computer model of the operational cycle of the water raising device has been developed. The model addresses the transient heat transfer, thermodynamic, fluid mechanics and economic aspects of the problem. The model was used to simulate the yearly operation of a nominal 2 ft. diameter x 5 ft. stroke piston operating with a 10 ft. head. The location of operation was assumed to be at a latitude of 32 exp 0 , which corresponds roughly to San Diego, California. Freon 21, Freon 12 and butane were investigated as the working fluid, with Freon 12 providing the maximum yearly pumping capacity. The economic model was used to compare the yearly cost of the solar pump with that of conventional pumps using available electricity, and conventional pumps with gasoline and diesel powered generators. It was determined that the solar pump would be competitive with the conventional pump for electrical power costs of about $0.10/kW-h, while if operating in areas where generators must be used, the solar pump will have significantly lower yearly costs. (ERA citation 05:013323)

13L. Safety Engineering

PAT-APPL-6-317 977 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Fire Extinguishant Materials.
Patent Application,
R. L. Altman, L. A. Mayer, and A. C. Ling. Filed 3 Nov 81, 11p N82-12168/2, NASA-CASE-ARC-11252-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Fire extinguishant materials were developed for extinguishing fires on hot metal surfaces caused by liquid fuels such as jet engine fuels. The composition of the materials is a mixture of a finely divided aluminum compound and alkali metal, stannous or plumbous halide. The aluminum compound may be aluminum hydroxide, alumina or boehmite, but preferably it is an alkali metal dawsonite. The metal halide may be an alkali metal, e.g. potassium iodide, bromide, or chloride, or stannous or plumbous iodide, bormide, or chloride. Potassium iodide is preferred. The presence of the halide improves the performance of the aluminum compound in extinguishing fires on hot metal surfaces.

PB82-131707 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Highway Accident Report: ARA Services, Inc., Tour Bus Denali National Park and Preserve (Mt. McKinley National Park), Alaska, June 15, 1981.
28 Sep 81, 29p NTSB-HAR-81-7

About 8:00 p.m. A.s.t., on June 15, 1981, a 40-passenger tour bus, eastbound on Denali Park Road, Denali National Park, Alaska, ran off the right edge of the roadway at a very slow speed and rolled to its right down a hillside. Twenty-five of the thirty-two occupants were ejected as the bus rolled 2 1/4 times down the hillside. Twenty-six occupants were injured, five were killed, and the bus sustained moderate damage. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the student driver to give adequate attention to the driving task and his misjudgment of his lateral position on the road which resulted in the bus leaving the right edge of the roadway and rolling down the hillside. Contributing to the accident was the driver's lack of training and experience in this tour bus operation. Contributing to the severity of the occupants' injuries and to the fatalities was the lack of occupant restraints which permitted the ejection of most of the occupants.

PB82-138850 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Hazardous Material Transportation Risks in the Puget Sound Region.
Final rept. Jan-Apr 81,
W. B. Andrews, R. E. Rhoads, A. L. Franklin, W. M. Cole, and R. G. Rau. Sep 81, 118p DOT-TSC-RSPA-81-11
Contract DTRS-57-80-C-00170

In order to contribute to workable hazardous materials accident prevention and response systems, public safety risks of transporting hazardous materials in the Central Puget Sound Region of Washington State are determined. Risk spectrums are obtained which express the magnitude and frequency of all possible losses due to releases of five classes of hazardous materials representing 74 percent of the 1.9 million tons moved in the region by truck and rail in 1979. Five commodities representative of these classes are selected and discussed: liquid petroleum gas, chlorine, methanol, anti-knock compound, and sodium hydroxide. Release sequences are identified, using a fault tree approach for specific transportation equipment, and are evaluated for each commodity and transportation mode to predict probabilities of releases given a transportation accident. Environmental factors considered include accident rates, weather conditions, and population along each major transportation route. Truck and rail contributions to risk are found to be nearly equal, with liquefied petroleum gas dominating truck risk, and chlorine dominating rail risk.

PB82-145137 PC **A06**/MF **A01**
Systems Technology, Inc., Hawthorne, CA.
Age Effects on Symbol Sign Recognition.
Final rept.,
R. Wade Allen, Zareh Parseghian, and Paul G. Van Valkenburgh. Dec 80, 124p TR-1133-1, FHWA/RD-80/126
Contract DOT-FH-11-9497

The use of symbolic road signs is proliferating on the highways, and the Federal Highway Administration is concerned with their effective use, particularly by the elderly driving population. This report describes an experimental study of problems encountered by a broad age range of drivers in learning and retaining symbolic information. A driving simulator was used to present 72 symbol signs to subjects during 25 minute 'drives'. Performance measures included the correctness of sign recognition, and the distance from the signs at which recognition took place. The experimental design looked at the effects of age, training, and sign format on the learning and retention of symbol knowledge. Subjects received three simulator trials, the first to determine initial symbol knowledge, a second immediately after symbol training to determine the amount of learning, and a final trial a week or so later to measure symbol knowledge retention. Sixty subjects were divided into four age groups (age range 20-79 years). The age groups were further subdivided into three training subgroups, each receiving a different symbol training treatment.

PB82-148255 PC **A06**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Fire Technology Abstracts: Volume 4, Issue No. 2.
Sep 81, 105p
Sponsored in part by Federal Emergency Management Agency, Washington, DC. See also Volume 4, Issue No. 3, PB82-148263.

Journal articles, books, reports and patents are abstracted and indexed in each annual volume, which consists of six issues. Subjects cover the dynamics of fire, behavior and properties of materials, fire modeling and test burns, fire protection, fire safety, fire service organization, apparatus and equipment, fire prevention, suppression, planning, human behavior, medical problems, codes and standards, hazard identification, safe handling of materials, insurance economics of loss and prevention and more. The journal contains bibliographic descriptions and detailed anstracts of each item. Documents are indexed by subject, author, publisher and report number.

PB82-148263 PC **A05**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.

Fire Technology Abstracts: Volume 4, Issue No. 3.
Nov 81, 86p
Sponsored in part by Federal Emergency Management Agency, Washington, DC. See also Volume 4, Issue No. 2, PB82-148255.

Journal articles, books, reports and patents are abstracted and indexed in each annual volume, which consists of six issues. Subjects cover the dynamics of fire, behavior and properties of materials, fire modeling and test burns, fire protection, fire safety, fire service organization, apparatus and equipment, fire prevention, suppression, planning, human behavior, medical problems, codes and standards, hazard identification, safe handling of materials, insurance economics of loss and prevention and more. The journal contains bibliographic descriptions and detailed abstracts of each item. Documents are indexed by subject, author, publisher and report number.

13M. Structural Engineering

AD-A108 344/3 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Foundations of Structures in Polar Waters.
Special rept.,
Edwin J. Chamberlain. Oct 81, 18p Rept no. CRREL-SP-81-25

Artificial islands and gravity- and pile-founded towers used for the exploration and production of petroleum resources in the Alaskan Beaufort Sea will be affected by conditions not found in more temperate waters. The force of sea ice, the thawing of subsea permafrost, and seasonal freezing and thawing all may cause failure of the foundations of these structures. To ensure the stability of foundations and fill structures, special precautions must be taken in selecting sites and evaluating the engineering properties of sea bed and fill materials. (Author)

PB82-135195 PC **A04**/MF **A01**
National Bureau of Standards, Boulder, CO. National Measurement Lab.
J-Integral Method for Fitness-for-Service Assessment.
Interim progress rept.,
D. T. Read, and H. I. McHenry. May 81, 53p NBSIR-81-1648
Sponsored in part by David W. Taylor Naval Ship Research and Development Center, Annapolis, MD.

The goal of this project is to produce a method for evaluation of material toughness requirements, allowable defect sizes, and sustainable stresses and strains. Yielding fracture mechanics and, specifically, the J-integral are employed. The J-integral is regarded as the crack driving force; applied J values above some critical value are predictive of material tearing. The applied J value is a function of applied stress and strain, crack length, and material tensile properties. The critical J-integral value is measured in material fracture-toughness tests. The experimental focus of the present study is on measurement of the applied J-integral as a function of stress and strain in HY130 specimens with different crack lengths.

PB82-139551 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Estimating Economic Impacts of Building Codes.
Final rept.,
Carol Chapman Rawie. Nov 81, 164p NBSIR-81-2402

This report describes a method for estimating the benefits and costs of proposed changes in building codes. A companion report by the author, Estimating Benefits and Costs of Building Regulations: A Step-by-Step Guide, published by the National Bureau of Standards as NBSIR 81-2223, provides a simplified description of the same basic method. This report shows the reader how to set up the problem, discount impacts to their present value, estimate code impacts on building costs, estimate effects on building safety, compute aggregate impacts, and conduct a sensitivity analysis. One chapter discusses the problem of assigning a dollar value to life safety. Worksheets and an extensive list of references, including sources of data on building costs and hazards, are included.

PB82-140252 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Field Measurement of Branch Circuit Wire Temperatures,
Thomas K. Faison. Oct 81, 45p NBSIR-81-2347
Sponsored in part by Department of Energy, Washington, DC.

The National Bureau of Standards (NBS), under the sponsorship of the U.S. Department of Energy (DOE), planned and conducted a program to monitor temperature excursions of residential branch circuit wiring under field conditions. This program was conducted to develop a field data base needed to determine the prevailing conditions in the field and to respond to various assertions that the encapsulation of branch circuit wiring within thermal insulation is a potential hazard. It has been demonstrated through previous laboratory investigations that buried wires, when operated continuously at rated ampacity, will exceed the thermal limit established by the National Electrical Code (NEC). Approximately 2,800 circuits in 667 residences were monitored through a volunteer program with the utilities. The results of the study show that slightly more than one-third of the circuits monitored operated at or above the thermal limit established by the NEC, 60C (140F). Thermal distributions are shown for variables such as: region, season, and age.

PB82-142076 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC.
Reduced-Scale Modeling of Mobile Home Fires: A Progress Report.
Interim rept.,
David P. Klein. Dec 81, 66p NBSIR-81-2333
Sponsored in part by Department of Housing and Urban Development, Washington, DC.

A series of fire tests was conducted in the bedroom of a single-wide mobile home and in a quarter-scale model of that bedroom. The objectives of the tests were to evaluate the relationship between fire buildup in the reduced-scale and full-scale enclosures and to determine the feasibility of using a reduced-scale model test to assess the potential contribution of particular combinations of interior finish materials to fire growth in a mobile home. The model tests simulated the phenomena of fire growth and flashover; however, the time to flashover occurred later in the model than in the full-scale bedroom. Flashover was taken as the time at which the level of radiation at the center of the floor reached 2 W/square centimeter. Several modifications to the model were examined but none adequately corrected the time delay to flashover. However, by monitoring the upper air temperature in the model, the occurrence or nonoccurrence of flashover for corresponding full-scale tests could be reliably predicted. Therefore, the use of a quarter-scale model was judged to be feasible.

PB82-142118 PC **A04**/MF **A01**
California Univ., Berkeley. Earthquake Engineering Research Center.
Two-Dimensional Hybrid Modelling of Soil-Structure Interaction,
Tsair-Jyh Tzong, Sunil Gupta, and Joseph Penzien. Aug 81, 59p UCB/EERC-81/11, NSF/CEE-81042
Grant NSF-PFR79-08979

A hybrid model formed by partitioning a soil-structure system into a near-field and a far-field has been successfully exploited in the analysis of three dimensional soil-structure interaction problems. The near field which consists of the structure and a finite region of soil around it is modelled by the finite element method. The far-field which accounts for the loss of energy due to stress waves travelling away from the foundation is modelled through continuous impedance functions. The main purpose of this investigation is to complement the previous research on three-dimensional hybrid modelling by employing the same technique to the two-dimensional case. To determine the two-dimensional frequency dependent impedance functions, a method of system identification is used to insure that the resulting hybrid model reproduces the known compliances of an infinite rigid strip on an elastic half-space. These impedance functions have been employed to calculate the compliances of the strip for different R/a ratios. Good agreement between the computed and known compliances is shown.

PB82-145244 PC **A05**/MF **A01**
Norsk Treteknisk Inst., Oslo.
Wood Foundations (Smahusfundamenter av Tre),
Tore Haavaldsen. Jun 79, 81p MEDDELELSE-58
Text in Norwegian, summary in English. Also pub. as ISSN-0546-3637.

This is a final report from a research project dealing with wood foundations for low-rise buildings. The research work has been carried out by The Norwegian Institute of Wood Working and Wood Technology in 1974-1978. The project is divided into the following parts: collection and studies of literature about the above mentioned topic, design of constructions and details, full scale testing of models in laboratory and in the field, establish calculations and design tables, cost analysis of different types of foundations (basements, crawl space, floor-on-ground, piles), production analysis of the same types of foundations, and marketing analysis of wood basements.

PB82-145301 PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations).
Jul 81, 87p EPA-450/4-80-023
See also PB82-145327. Errata sheet inserted.

This report provides background information used to develop a means of computing good engineering practice (GEP) stack height per the requirements of Section 123 of the Clean Air Act, as amended. The report also summarizes the application of the structure-based formula to determine GEP stack height under different general building formations.

PB82-145327 PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guideline for Use of Fluid Modeling to Determine Good Engineering Practice Stack Height.
Jul 81, 53p EPA-450/4-81-003
See also PB82-145301.

The report presents guidelines for developing and reviewing fluid modeling studies for determining good engineering practice stack height. It includes review of appropriate fluid modeling theory and a specific report requirement checklist.

PB82-147794 PC **A16**/MF **A01**
Portland Cement Association, Skokie, IL. Construction Technology Labs.
Structural Walls in Earthquake-Resistant Buildings: Dynamic Analysis of Isolated Structural Walls. Development of Design Procedure - Design Force Levels.
Final rept.,
Arnaldo T. Derecho, M. Iqbal, S. K. Ghosh, Mark Fintel, and W. Gene Corley. Jul 81, 366p NSF/CEE-81061
Grant NSF-ENV77-15333

A procedure is used to establish estimates of stiffness, strength, and deformation demands of isolated structural walls subjected to ground motions of varying intensity. The investigation characterizes earthquake ground motions to select critical input motions; identifies the most significant structural and ground motion parameters; and formulates a simple design procedure for correlating earthquake demands with structural capacities. The computer program that was used to analyze the variables, DRAIN-2D, is described. The compilation of maximum or near-maximum values of the significant response quantities is shown to be a major step in determining design force levels for earthquake-resistant structural walls. The procedure, which is based on fundamental period and flexural yield level, is illustrated for the case of twenty-story walls subjected to input motions.

PB82-147836 PC **A02**/MF **A01**
Hawaii Univ. at Manoa, Honolulu. Dept. of Civil Engineering.
Damping Measurements of Tall Structures.
Final rept.,
George T. Taoka. 1980, 18p NSF/RA-800613
Grant NSF-ENV75-16926

Results of an investigation of damping measurements of five tall steel structures are presented. The structures include four buildings ranging in height from 103 to 170 meters, and a four-legged square tower of a total height of 333 meters. For each structure, ambient vibration records were mechanically digitized and analyzed by three system identification methods: the cor-

relation method, the spectral moments method, and the power spectral density method. A trapezoidal filter was used to isolate individual modes before the records were subjected to analysis. Damping estimates were also obtained under forced vibration rotating shaker tests. These estimates appeared to be consistent with those obtained under ambient conditions for fundamental modes of vibration. Considerable variations were present when damping ratios for higher mode estimates were compared.

PB82-147901 PC **A07**/MF **A01**
Portland Cement Association, Skokie, IL. Construction Technology Labs.
Coupled Walls in Earthquake-Resistant Buildings: Parametric Investigation and Design Procedure,
Murat Saatcioglu, Arnaldo T. Derecho, W. Gene Corley, and Richard A. Parmelee. Jul 81, 136p NSF/CEE-81055
Grant NSF-ENV77-15333

This project developed and analyzed design information on the behavior of multi-story structures during earthquakes. Structural and ground motion parameters, their effects on dynamic response, the most significant parameters as design variables, and relationships among the design variables were examined. A computer program was used to investigate nonlinear response of coupled wall structures. The analytical modeling procedures used are given and the effects of structural parameters on dynamic inelastic response of coupled walls are discussed. Properties of structures with different mass for inertia are noted. General information is provided concerning earthquake resistant design and variables found to be significant in formulating a design procedure. Factors considered include the beam-to-wall stiffness ratio, wall strength, beam-to-wall strength ratio, yield deformation level, and earthquake characteristics.

PB82-147919 PC **A06**/MF **A01**
Washington Univ., St. Louis, MO. Dept. of Civil Engineering.
SHORE IV: Finite Element Program for Dynamic and Static Analysis of Shells of Revolution (Theoretical Manual).
Final rept.,
O. M. El-Shafee, P. K. Basu, B. J. Lee, and P. L. Gould. Oct 81, 108p 57, NSF/CEE-81057
Grant NSF-PRF79-00012
See also PB82-147927.

The theoretical background of the software (SHORE-IV) for the static and dynamic analysis of axisymmetric shells and plates is provided. In the SHORE-IV program, the shell is discretized by high precision rotational shell finite elements of any quadratic shape. The thickness of the element may vary in the meridional direction. To consider the effect of regularly spaced members at the base or at some intermediate level of the shell, special open type elements are used. The shell may be orthotropic (single or multi layer), isotropic, or framed. The program can handle both axisymmetric and asymmetric external effects such as mechanical and thermal loads, horizontal and vertical base accelerations, and support settlements. The soil structure interaction can be included in the analysis for shells founded over shallow ring footing. The soil medium may be deep or shallow strata. The program can take care of layered soil material as well as half-space soil medium.

PB82-147927 PC **A06**/MF **A01**
Washington Univ., St. Louis, MO. Dept. of Civil Engineering.
SHORE -IV: Finite Element Program for Dynamic and Static Analysis of Shells of Revolution (Users' Manual).
Final rept.,
O. M. El-Shafee, P. K. Basu, B. J. Lee, and P. L. Gould. Oct 81, 124p 56, NSF/CEE-81056
Grant NSF-PFR79-00012
See also PB82-147919.

The SHORE-IV computer program is designed for the linear static and dynamic analysis of arbitrarily loaded thin to moderately thick elastic shells of revolution. Axisymmetric shells founded on footing foundations may be analyzed dynamically including the soil structure interaction effect. This user manual describes the procedure to be followed in preparing the input data for this program. Cards for problem identification, problem control, element, nodal point, material information, displacement function, output requirement, control data, soil, and loading information are described. A number of sample inputs and outputs utilizing the various options of the program are included. The image of the system control cards used to run SHORE-IV is shown and the elements of the constitutive matrix for isotropic and single-layer and multi-layer orthotropic shells are given. Intermediate printout option codes are provided. In addition, a program is provided for calculating Fourier coefficients.

PB82-860487 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Architectural Considerations for Musical Acoustics. 1975-January, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 82.
Jan 82, 170p

The bibliography cites reports on the design, construction, and evaluation of enclosures of various sizes, shapes, and materials with respect to their musical acoustics. (Contains 179 citations fully indexed and includes a title list.)

PB82-861238 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Inflatable Structures. 1977-January, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1977-Jan 82.
Jan 82, 83p

Topics in this bibliography include innovations in manufacturing, performance, and materials of inflatable structures. Other topics discussed include those considering airhouses, inflatable boats, surgical rubber balloons inflated in arteries to control bleeding, air cushion vehicle skirting, inflatable material reinforcing agents, calendering techniques of fabrics to manufacture inflatable natural rubber, and mold designs for vulcanizing inflatable fenders. Performance evaluations of inflatable structures for building applications are also included. (Contains 103 citations fully indexed and includes a title list.)

PB82-861246 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Inflatable Structures. 1970-January, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 82.
Jan 82, 135p

Reports are cited which discuss the development, fabrication, and application of inflatable structures. Inflatable fabric roof structures for office buildings, shopping malls, warehouses, and whole communities are examined relative to economic advantages, solar designs, durability, and fabric composition. Quick erection storage facilities, greenhouse laboratories, offshore platforms, life rafts, deep ocean pipelines, and ground mounted radomes are included with reference to innovations in inflatable structure design and function. (Contains 143 citations fully indexed and includes a title list.)

PB82-861253 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Inflatable Structures. 1972-January, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Jan 82.
Jan 82, 175p
Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains abstracts of reports concerned with the development of inflatable structures with reference to performance evaluations, applications, economics, and technology. Primary consideration is given to military applications such as inflatable troop seats in aircraft, parachute technology and performance, airship structure technology, and inflatable head and neck restraint systems for helicopter crewpeople. However, space shuttle solid booster rocket retrieval systems, inflatable solar collector innovations, air-filled antennas for space radar navigation, and temporary inflatable building structures are also examined. Air cushion landing systems for aircraft are included. (Contains 167 citations fully indexed and includes a title list.)

14.
METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A108 216/3 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
A Unified Treatment of the Langmuir Probe and Diode Equations,
Christopher Sherman. 19 May 80, 6p Rept no. AFGL-TR-81-0335
Pub. in Jnl. of Applied Physics, v52 n11 p6567-6571 Nov 81.

No abstract available.

AD-A108 227/0 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Pulse Counter,
Ya. G. Doblevich, L. A. Dubitskiy, Yu. M. Sikorskiy, Yu. I. Kuz'min, and Ya. I. Pilyavskiy. 5 Nov 81, 7p
Rept no. FTD-ID(RS)T-1157-81
Edited trans. of Patent (USSR) 298 053, p1-2, 11 Mar 71, by Robert D. Hill.

No abstract available.

AD-A108 316/1 PC **A04**/MF **A01**
Accumetrics Corp., Cambridge, MA.
Applied Research and Development of Falling-Sphere Densitometer Payloads of Improved Design.
Final rept. Jan 79-Aug 81,
Donald H. Fryklund. Aug 81, 66p AC-267, AFGL-TR-81-0233
Contract F19628-79-C-0058

Four complete falling-sphere densitometer systems were designed and launched, with generally satisfactory results, at three locations: New Mexico, Sweden, and Alaska. The task included the provision and launch responsibility for the nose cones and ejection systems for all densitometers and the provision and launch responsibility for two unique support units for the payloads flown in Sweden. Refinements were made to improve system accuracy in the calibration and data reduction techniques for the Z-axis channels of the sphere. The Z-axis amplifiers have been modified to improve their performance. A wide-band accelerometer was designed and integrated into the sphere system to provide for a high resolution instrument to enable small-scale wind and turbulence studies of the high-altitude atmosphere. The sphere has been reintegrated to provide for a more powerful transponder and a PCM-ranging system. A study was made to reassess the sphere configuration to reduce its gross weight. Design changes will reduce this weight by 1 lb. Additional volume was recovered for future expansion in the sphere instrumentation.

AD-A108 409/4 PC **A03**/MF **A01**
Navy Experimental Diving Unit, Panama City, FL.
Cost Analysis of NEDU's Helium Reclaimer.
Survey rept.,
Eric Randall. Sep 81, 31p Rept no. NEDU-9-81

The analysis compares the cost effectiveness of reclaiming helium from the Navy Experimental Diving Unit's (NEDU) Ocean Simulation Facility (OSF) Hyperbaric Chamber Complex using a Helium Reclamation System manufactured by DIVETEC Systems, Inc. to purchasing pure helium from the U.S. Department of the Interior Bureau of Mines. The cost of electrical power, maintenance and upgrade of the Helium Re-

claim System is considered along with the effects of various inflation rates. A discounted cash flow analysis is provided. (Author)

AD-A108 417/7 PC **A05**/MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
Beyond Three Decades of Continuous Research at UTIAS on Shock Tubes and Waves.
Interim rept.,
I. I. Glass. Jul 81, 85p UTIAS-45, AFOSR-TR-81-0783
Grant AFOSR-77-3303
Presented at the International Symposium on Shock Tubes and Waves (13th), Niagara Falls, NY. 6-9 Jul 81.

Analytical and experimental research on nonstationary shock waves, rarefaction waves and contact surfaces has been conducted continuously since 1948. Some unique facilities were used to study the properties of planar, cylindrical and spherical shock waves and their interactions. Investigations were also performed on shock-wave structure and boundary layers in ionizing argon, water-vapor condensation in rarefaction waves, magnetogasdynamic flows, and the regions of regular and various types of Mach reflections of oblique shock waves. Explosively-driven implosions have been employed as drivers for projectile launchers and shock tubes, and as a means of producing industrial-type diamonds from graphite, and fusion plasmas in deuterium. The effects of sonic-boom on humans, animals and structures have also formed an important part of the investigations. More recently, interest has focused on shock waves in dusty gases, the viscous and vibrational structure of weak spherical blast waves in air, and oblique shock-wave reflections. In all of these studies instrumentation and computational methods have played a very important role. A brief survey of this work is given with some perspectives on future research.

AD-A108 418/5 PC **A05**/MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
On a Dusty-Gas Shock Tube.
Interim rept.,
H. Miura, and I. I. Glass. May 81, 86p UTIAS-250, AFOSR-TR-81-0787
Grant AFOSR-77-3303

Analytical and numerical methods were used to investigate the flow induced by a shock wave in a shock-tube channel containing air laden with suspended small solid particles. Exact results are given for the frozen and equilibrium shock-wave properties as a function of diaphragm-pressure ratio and shock-wave Mach numbers. The driver contained air at high pressure. A modified random-choice method together with an operator-splitting technique show clearly both the decay of a discontinuous frozen shock wave and a contact discontinuity and the formation of a stationary shock structure and an effective contact front of finite thickness. The effects of particle diameter, partial-number density and diaphragm-pressure ratio on the transitional behaviour of the flow are investigated in detail. The alteration of the flow properties due to the presence of particles is discussed in detail and compared with classical shock-tube flows. (Author)

AD-A108 423/5 PC **A04**/MF **A01**
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Acoustic Microscopy for Nondestructive Evaluation of Materials.
Annual rept. 1 Jul 80-30 Jun 81,
C. F. Quate. Jul 81, 60p GL-3295, AFOSR-TR-81-0773
Contract F49620-78-C-0098, ARPA Order-3569

This report covers the results of a research program on Acoustic Microscopy directed toward the study of integrated circuits and solid materials. This new type of microscopy permits one to examine microscopic features that are unaccessible in the optical microscope. Thus detail beneath metallization layers as well as the grain boundaries in polished samples can be examined without resorting to chemical etching. Adhesion of thin film is a field where acoustic microscopy will play an important role. (Author)

AD-A108 427/6 PC **A07**/MF **A01**
Spectron Development Labs., Inc., Costa Mesa, CA.
Flow Velocity and Angularity Measurements in the FDL Transonic Gasdynamic Facility and Self-Adaptive Wall Wind Tunnels with a Laser Transit Anemometer.
Final rept. Apr-Nov 80,
William T. Mayo, Jr., Anthony E. Smart, and James D. Trolinger. Aug 81, 143p SDL-81-2162-05FR, AFWAL-TR-81-3081
Contract F33615-79-C-3030

The measurement of a backscatter laser transit anemometer was tested in the FDL Trisonic Gasdynamics Facility (TGF) and the nine-inch Self Adapting Wall (SAW) wind tunnel. The tests included flow analysis in the two foot by two foot subsonic, transonic and supersonic test sections as well as the fifteen-inch transonic test section insert all in the TGF. The magnitude and flow angle precisions were as good as 0.3% and 0.3 deg, respectively, as limited by the statistical fluctuations of the data. Calculations indicate that the minimum natural particle size observed in the TGF was approximately 0.2 micron in diameter. Flow speed and angle were mapped about a microfighter flow field in the TGF fifteen-inch transonic test section at Mach number 0.7 and 0.9 to develop a data base for evaluation of the Self Adaptive Wall wind tunnel concept. Measurements were then made to the same model in the FDL nine-inch Self Adaptive Wall wind tunnel. These indicated that the precision of the instrument exceeded the current precision to establish and repeat flow conditions in the tunnel. The SAW results indicated non-uniform particle content of the flow which adversely affected the available angle precision; however, velocity measurements were good. Presentation of the equipment and measurement results of the present project are included. (Author)

AD-A108 657/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
Electron Energy Loss Spectroscopy of Gallium Arsenide and Other Materials.
Annual progress rept. 1 Jul 80-30 Jun 81,
Margaret H. Weiler. 10 Nov 81, 17p AFOSR-TR-81-0800
Contract F49620-79-C-0176

This report describes the construction and testing of a new electron energy loss spectrometer to study the band structure of GaAs and other materials using the inelastic scattering of 230keV electrons. Substantial progress has been made towards the realization of a working experiment in high-energy electron energy loss spectroscopy, with which to study the electronic states in GaAs and other materials. In the following sections we give details of our progress in the major components of the project: electron optics, electronics, high-voltage terminal, sample preparation, and data reduction.

AD-A108 676/8 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Wind Tunnel and Laboratory Calibration of Balloon-Borne Wind Sensors.
Instrumentation papers,
J. H. Brown, and R. E. Good. 27 Jul 81, 33p Rept nos. AFGL-TR-81-0219, AFGL-IP-303

Two-low speed wind sensors have been calibrated for measuring the wind speed at an instrument suspended below stratospheric balloons. The low Reynolds number environment was duplicated at the NASA/Ames low-speed MARSWIT wind-tunnel facility, and in a laboratory bell jar. The two new instruments are the time-of-flight instrument that measures the motion of an ion cloud through an open pipe, and the corona anemometer that measures the displacement of an ion beam transversing the air-stream flowing between two plates. The calibrations consist of placing the instruments in a flow stream, and relating the instrument output to the flow-stream velocity. The laboratory calibration is easy to conduct, but is limited to a measurement of internal flow velocity. The wind-tunnel calibration is performed to relate laboratory calibration to freestream conditions. (Author)

AD-A108 725/3 MF **A01**
Northrop Corp., Hawthorne, CA. Aircraft Div.
Vortex Flow Correlation.
Final rept. May-Oct 80
Gary E. Erickson. Jan 81, 357p NOR-80-152, AFWAL-TR-80-3143
Contract F33615-80-C-3024
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Key parameters have been identified which permit correlation of vortex flow simulations in a water tunnel with wind tunnel and flight data. Vortex generation, vortex sheet and core location, and a vortex strength on thin slender wings are accurately represented in a water tunnel due to the insensitivity of separation point location to changes in Reynolds number. The fact that theoretical methods which ignore viscous effects can reasonably predict vortex flow aerodynamics is one indication of the Reynolds number insensitivity of these flow phenomena. For wings and bodies where separation point varies with Reynolds number, the fundamental vortex structure is similar regardless of Reynolds number value since vortices at a distance from the generating surfaces are embedded in essentially irrotational flow. External pressure gradient is an important parameter affecting vortex stability and, although there is yet no theoretical verification that this parameter is the dominant one, vortex burst at higher angles of attack for a given configuration occurs at comparable positions in water tunnels as in wind tunnels and flight. A water tunnel is a powerful diagnostic tool capable of providing high-quality flow visualization of complex fluid flows and insight into the phenomenological aspects of vortex generation, interactions between multiple vortices and aerodynamic surfaces and vortex burst. (Author)

AD-A108 741/0 PC **A99**/MF **A01**
Rockwell International, Thousand Oaks, CA. Science Center.
Proceedings of the DARPA/AFWAL Review of Progress in Quantitative Nondestructive Evaluation, held 14-18 July 1980, Scripps Institution of Oceanography, La Jolla, California.
Final rept. 1 Oct 79-1 Jan 81,
R. Bruce Thompson, and P. M. Beckham. Sep 81, 608p SC5250.22FR, AFWAL-TR-81-4080
Contract F33615-80-C-5004
See also Rept. no. SC595.70AR, AD-A094 826.

The edited transcripts of the DARPA/AF Review of Progress in the Interdisciplinary Program for Quantitative Nondestructive Evaluation (NDE) held on July 14-18, 1980, at Scripps Institution of Oceanography, La Jolla, California are presented in this document. Several key topics form the core of these presentations and discussions. They include retirement for cause, quantitative ultrasonics, acoustic emission, electromagnetic techniques, and the reliability of NDE techniques for metals, ceramics, and composites. It is believed that this document provides a reasonable summary of NDE research and development currently underway. (Author)

AD-A108 749/3 PC **A04**/MF **A01**
Science Applications, Inc., McLean, VA.
Simulation of Nuclear Thermal Radiation with High Intensity Flashlamps.
Topical rept. 27 Mar 78-26 Jan 79,
J. E. Cockayne, T. M. Knasel, W. Koechner, and P. Manzo. 26 Jan 79, 68p SAI-79-868-WA, DNA-4789T
Contract DNA001-78-C-0203

Problems relating to the simulation of high flux nuclear weapon thermal radiation are presented. Existing potential simulators are discussed and limitations identified. A potential simulator using flashlamps is outlined in detail. Theoretical calculations and preliminary design drawings are presented. Advantages of flashlamps, including first pulse simulation, UV spectrum component matching, and accurate second pulse shaping, are discussed. (Author)

AD-A108 752/7 PC **A06**/MF **A01**
Hughes Aircraft Co., Canoga Park, CA.
Analysis of Built-in-Test (BIT) False Alarm Conditions.
Final technical rept. 24 Jan 80-28 Feb 81,
John G. Malcolm, and Richard W. Highland. Aug 81, 122p RADC-TR-81-220
Contract F30602-80-C-0074

Usefulness of BIT is seriously affected by the presence of false alarms. False alarms can degrade mission effectiveness of systems and contribute to the expenditure of excessive maintenance resources. The objectives of this study were to determine the root causes of the false alarm problem and to develop design guidelines to minimize the occurrence and the effect of false alarms. False alarm rates have been established for the three systems investigated and prediction factors defined. (Author)

N82-13169/9 PC **A03**/MF **A01**
Fraunhofer Inst., Freiburg im Breisgau (Germany, F.R.).
JASPIC-DIP: The Digital Impedance Probe in the JASPIC Project.
Final Report.
E. Neske, and J. Molnar. Dec 80, 48p BMFT-FB-W-80-034, ISSN-0170-1339
In German: English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A digital impedance probe (DIP) was developed to be used in the Joint American Soviet Particle Inter-Calibration (JASPIC) program. It is capable on the one hand of providing fast and reliable estimates of the electron density height profiles in the nocturnal ionosphere, and on the other hand, of delivering density data with high accuracy during the subsequent analysis. Two techniques were developed: (1) fast scanning automatic resonance detection, and (2) slow scanning frequency-magnitude transmission. Apparatus and electronics are described. Results of rocket-borne experiments indicate DIP to be superior to three other diagnostical techniques, or to be necessary for their calibration.

N82-13274/7 PC **A12**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Fatigue Test Methodology.
Oct 81, 255p AGARD-LS-118, ISBN-92-835-1401-7
Proc. Of Lecture Series Held at Lyngby, Denmark, 19-20 Oct. 1981; Lisbon, 22-23 Oct. 1981; Athens, 26-27 Oct. 1981.

No abstract available.

N82-13410/7 PC **A04**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Foa 27 Control Instruments Data System. Control Instruments and Their Functions Foa Institution 27 Maetdatorsystem. Maetinstrumenten och Deras Funktioner.
S. Wahlstroem, and B. Sandberg. Feb 81, 62p FOA-C-20394-D3
Text in Swedish.

Computerized control posts using analog processing with digital conversion capability are discussed. The functioning of the different instruments, performance, and experience gained after a certain period with the system is reviewed. Topics covered amplifiers, filters, converters, transient recorders, temperature measuring instruments, and signal processing devices.

N82-13469/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Interpolating for the Location of Remote Sensor Data.
E. F. Puccinelli, and J. Kornfield. Jul 81, 23p NASA-TM-82169

An interpolation algorithm is presented as a practical alternative to common interpolation and approximation methods when applied to the problem of determining the location of remote sensor data. This algorithm is based upon knowledge of the geometry of the problem and is shown to be inherently more accurate than common interpolation schemes which may be applied to all types of data. A practical location problem is used to demonstrate its accuracy and computational cost.

ORNL/TM-7260 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Digital TV-Echelle Spectrograph for Simultaneous Multielemental Analysis Using Microcomputer Control.
J. B. Davidson, and A. L. Case. Dec 80, 26p
Contract W-7405-ENG-26

A digital TV-echelle spectrograph with microcomputer control was developed for simultaneous multielemental analysis. The optical system is a commercially available unit originally equipped for film and photomultiplier (single element) readout. The film port was adapted for the intensifier camera. The camera output is digitized and stored in a microcomputer-controlled, 512 x 512 x 12 bit memory and image processor. Multiple spectra over the range of 200 to 800 nm are recorded in a single exposure. Spectra lasting from nanoseconds to seconds are digitized and stored in 0.033 s and displayed on a TV monitor. An inexpensive microcomputer controls the exposure, reads and displays the intensity of predetermined spectral lines, and calculates wavelengths of unknown lines. The digital addresses of unknown lines are determined by superimposing a cursor on the TV display. The microcomputer also writes into memory wavelength fiducial marks for alignment of the TV camera. (ERA citation 06:008094)

PAT-APPL-6-298 687 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Atmospheric Aerosol Extinctiometer.
Patent Application,
Harold S. Stewart. Filed 2 Sep 81, 39p AD-D009 038/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The extinction coefficient of atmospheric aerosol is measured by an instrument in which a single light beam from a graybody source is alternately directed through two similar optical paths to a detector. Each optical path traverses an equal length region of ambient air. Aerosols are filtered from the ambient air region of one optical path. The detector measures the modulation of the incident radiation and its output is a function of the extinction coefficient of the ambient air under test. A second detector is used to monitor the beam power. Processing electronics compute the extinction coefficients of the ambient air under test from the detector outputs. The ambient air regions of the two beam paths are alternately filtered for improved performance.

PAT-APPL-6-311 587 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Apparatus for Continuous Injection of Chemically-Impregnated Filament.
Patent Application,
Jim E. Dale. Filed 15 Oct 81, 17p PB82-148552
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to an apparatus which continuously applies an agricultural chemically-impregnated chemical filament to soil.

PATENT-4 299 451 Not available NTIS
Department of the Air Force, Washington, DC.
Minimum Resolvable Contrast Measurement Device.
Patent,
Harry L. Task, and Gilbert G. Kuperman. Filed 15 Apr 80, patented 10 Nov 81, 8p AD-D009 056/3, PAT-APPL-6-144 465
Supersedes PAT-APPL-6-144 465, AD-D007 285.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An apparatus is disclosed for creating images of nonperiodic patterns, which patterns are variable in contrast with respect to a uniform and constant level of background luminance. Two beams of uniform luminance are projected through individual, orthogonally oriented linear polarizers, and then into a common cube beam splitter to be divided and interlaced. One combined output beam from the splitter is projected through a rotatable linear polarizer onto the image sensing optical detector undergoing test. The second beam is projected toward a detection system. The patterned region of the second beam passes through a second rotatable linear polarizer, synchronized to the first rotatable polarizer, and onto a CCD array detector system. Contrast between the pattern and the background is represented by the two electrical voltage levels in the array output, irrespective of the spatial frequencies in the pattern. Two unpatterned background regions from either of the interlaced beams are projected through individual and orthogonal linears polarizers to individual luminance detectors. Each detector, in turn, regulates its corresponding beam intensity to compensate for drift in the beam generating elements. (Author)

PATENT-4 299 482 Not available NTIS
Department of the Air Force, Washington, DC.
Measurement of Windscreen Distortion Using Optical Diffraction.
Patent,
Harry L. Task. Filed 1 Nov 79, patented 10 Nov 81, 6p AD-D009 055/5, PAT-APPL-6-090 383
Supersedes PAT-APPL-6-090 383, AD-D006 828.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns a measurement apparatus and method for detecting, resolving and quantifying the distortion caused by a relatively large region of a distorting optically transparent medium. A precisely defined pattern is viewed through the transparent medium to introduce the distortion effects. The altered pattern is photographically recorded in thin film transparency format. A beam of coherent luminous energy projected through the transparency, once focused, produces a Fraunhofer diffraction pattern which is the Fourier transform of the original pattern. Conventional distortion characteristics in the Fourier domain appear in a form more amenable to quantification and analysis. The character and magnitude of the distortion is readily ascertained by comparing the transforms of distorted and undistored patterns, yielding quantitative data comparable to conventional distortion effects in terms of grid line slop and lens factor.

PB82-133554 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC.
AC Transmission Line Field Measurements.
Interim rept. Apr 75-Aug 77,
F. Ralph Kotter, and Martin Misakian. Oct 81, 84p NBSIR-77-1311
Contract DOE-EA-77-A-01-6010

The influence of temperature, relative humidity, frequency, waveform, proximity of the observer, as well as other parameters, on the accuracy of a small number of two commercially available ac electric field meters is documented. Procedures for the calibration of these instruments are reviewed and guidance is given for the construction of a calibration facility suitable for use in achieving calibrations to an accuracy of 1 percent. Measurement errors which develop when these meters are used in a highly nonuniform single-phase field are investigated theoretically and experimentally. The performance of a magnetic field probe provided as an accessory with one of the field meters is described, and an analysis of the accuracy to be expected from the use of simple multi-turn rectangular loops for the calibration of such magnetic field meters is given.

PB82-135534 PC **A02**/MF **A01**
Bureau of Mines, Amarillo, TX. Helium Operations.
Automatic and Continuous Transducer-Drift Compensator for Endpoint Detection Systems.
Rept. of investigations,
Charles A. Seitz, and George M. Lucich. Oct 81, 15p BUMINES-RI-8568

This Bureau of Mines report describes an automatic and continuous transducer-drift compensator. The compensator formed a part of the instrumentation used to indicate the saturation by hydrogen of a cryogenic, adsorption column. It has a variable delayed-response characteristic and will respond only to signals having rise times faster than component drift times. Zero drift due to varying ambient conditions and component aging is nullified. Equations relating the output as a function of the input signal are given.

PB82-135922 PC **A02**/MF **A01**
Stanford Univ., CA. Stanford Electronics Labs.
Innovative Measurement Technology for the Semiconductor Device Industry Based on Electron Spectroscopy.
Final rept. 1 Jul 75-31 Dec 78,
C. R. Helms, S. A. Schwarz, and W. E. Spicer. Nov 81, 12p NBS-GCR-81-345
Contract NBS-5-35944, ARPA Order-2397
Prepared in cooperation with Varian Associates, Inc., Palo Alto, CA.

This report summarizes the results of a 3-1/2 year research effort on electron spectroscopy techniques used in conjunction with ion etching for characterizing materials and structures used in semiconductor device technology. Results include both the establishment of the capabilities and limitations of these techniques and their application in studies of the chemistry, stoichiometry, and morphology of interfaces present in MOS device structures. A list of 27 publications which provide details of the various results is included in the report.

PB82-137399 Not available NTIS
National Bureau of Standards, Washington, DC.
Simple Control Circuit for Temperature Regulation and Other Bridge Applications.
Final rept.,
R. D. Cutkosky, and R. S. Davis. Sep 81, 3p
Pub. in Review of Scientific Instruments 52, n9 p1403-1405 Sep 81.

A circuit is presented that makes use of low frequency square waves for exciting resistance bridges, detecting their departure from balance, and providing an output voltage for measurement or control purposes. Applications in several areas of precision metrology have been found.

PB82-137480 Not available NTIS
National Bureau of Standards, Washington, DC.
Free-Space Transmission Loss of Anechoic Chamber Performance Evaluation.
Final rept.,
R. G. FitzGerrell. 1981, 2p
Pub. in Proceedings of IEEE International Symposium on Electromagnetic Compatibility (1981), Boulder, Colorado, August 18-20, 1981, p110-111.

A longitudinal probe scan of an anechoic chamber yields a plot of measured transmission loss. Any deviation of this curve from calculated free-space transmission loss can be attributed to chamber reflections or, at small separation distances, to finite-range source antenna gain corrections or to source-probe interactions.

PB82-143959 Not available NTIS
National Bureau of Standards, Washington, DC.
Singularities in the Calibration of Six-Port Network Analyzers.
Final rept.,
H. F. Ebbesen, and G. F. Engen. 1981, 2p
Pub. in Proceedings of IEEE MTT-S International Microwave Symposium (1981), Los Angeles, California, June 15-19, 1981, Paper in IEEE MTT-S International Microwave Symposium Digest, IEEE Cat. No. 81CH1592-5, p149-150.

Numerical difficulties may be encountered when applying the TRL calibration algorithm to dual six-port analyzers. The possible occurrence of singularities is explained, and means of avoiding these are proposed.

PB82-144056 Not available NTIS
National Bureau of Standards, Washington, DC.
Design, Construction, and Calibration of the Broadband Electric Field Monitor (EFM-5).
Final rept.,
J. E. Cruz. 1981, 6p
Pub. in Proceedings IEEE International Symposium on Electromagnetic Compatibility (1981), Boulder, Colorado, August 18-20, 1981, p439-444.

A broadband electric field monitor (EFM) in the frequency range of 200 kHz to 1 GHz has been developed with an isotropic response pattern and a 60 dB dynamic range (1 volt/meter to 1000 volts/meter). The readout is in terms of the total electric field magnitude. The EFM is designed to not perturb the field being measured and can measure average cw fields. This paper emphasizes the design and calibration of the EFM-5.

PB82-146077 PC **A02**/MF **A01**
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Scale Models in Control Systems Engineering.
P. E. Wellstead. Jun 80, 21p CONTROL SYSTEMS CENTRE-482

The article describes the role played by scale models in dynamical systems studies and control engineering. As a tangible example the development at the Control Systems Centre, UMIST, of a series of scale models for control systems studies is described. The models form a comprehensive set of equipment which are used for laboratory investigations of process systems, material transport problems, electro-mechanical control, and the like. The paper describes how such a range of models are used to illustrate the essential features and methods of mathematical modelling, system identification, analysis, and control.

PB82-146135 PC **A04**/MF **A01**
Association of American Universities, Washington, DC.
The Scientific Instrumentation Needs of Research Universities.
Jun 80, 58p NSF/RA-800802
Grant NSF-PRM79-25829

An assessment is presented of the needs of 16 of the major research universities in the United States for scientific instrumentation. The fields of research examined are physics, chemistry, biological sciences, earth sciences, and engineering. The instrumentation used by the university researchers is contrasted with that available to researchers in several of the leading governmental and commercial laboratories. Major problems are discussed concerning instrumentation acquisition and replacement, operation and maintenance costs, facilities construction and renovation, and funding. Based on the information gathered, recommendations are made for funding policies to facilitate the acquisition and maintenance of research equipment. Described are the research methodology, including interview procedures, and the context of the problem in regard to the role of instrumentation and funding policies, programs, and trends. The appendices provide case histories of research instrumentation, statistical data, and site visits. Also included is the general policy and information statement of the Biomedical Research Support Grant Program (April, 1979) for supporting non-Federal institutions.

PB82-147406 PC **A06**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Technical Assistance Document for the Calibration and Operation of Automated Ambient Non-Methane Organic Compound Analyzers.
Final rept.,
Frederick W. Sexton, Raymond A. Michie, Jr., Frank F. McElroy, and Vinson L. Thompson. Mar 81, 122p
EPA-600/4-81-015
Contract EPA-68-02-3222

This technical assistance document is intended to serve as a supplement to manufacturers' instruction manuals for automated, ambient, non-methane organic compound analyzers. It addresses augmented setup, calibration, operation, and maintenance procedures that have been developed for the purpose of producing non-methane organic compound data suitable for use in the Empirical Kinetic Modeling Approach and other dispersion models used to predict ozone concentrations. The document initially discusses common aspects of these procedures in general terms for hydrocarbon analyzers as a whole and then specifically addresses their application to analyzers manufactured by The Bendix Corporation, Mine Safety Appliances Company, and Beckman Instruments, Inc., and Meloy Laboratories, Inc.

PB82-860826 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Position Sensing. June, 1974-January, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 74-Jan 82.
Jan 82, 141p
Supersedes PB80-857725.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

Citations in this bibliography include the design innovations and development of various types of position sensing devices for mechanical applications. Among the topics discussed are the design and analysis of a fluidic/pneumatic position servo, mechanically operated electromagnetic linear positioning systems, digital position tracking systems, and electrooptical sensing system for precise position determination. Applications described include adaptive optical systems, monitoring angular rotation in mechanical devices, wind tunnel magnetic suspension position sensing systems, control systems for pneumatic stepping motors, machine tool design, assembly line flow control, industrial robots and drafting machines. (This updated bibliography contains 137 citations, 52 of which are new entries to the previous edition.)

PB82-861105 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Surface Inspection and Dimensional Measurement: Laser applications. 1975-January, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1975-Jan 82.
Jan 82, 70p

Non-contact optical methods for measuring surface finish, flatness, length, speed, and diameter using lasers are discussed in the cited reports. The application of laser scanners for surface defect location and classification in the steel-making industry is considered. The inspection of finished metal pieces by electro-optical laser methods is included. Dimensional inspection of manufactured parts and control of machining operations by dimensional checking with laser scanners are also considered. (Contains 85 citations fully indexed and includes a title list.)

SAND-80-0137C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Computer Controlled System for Automatic Setup, Calibrating, Checkout, and Conversion of Multichannel Transient Test Data.
1980, 8p CONF-800502-10
Contract EY-76-C-04-0789
26. international instrumentation symposium, Seattle, WA, USA, 5 May 1980.

One of the major problems with multichannel transient (50 kHz, 50 ms) tests is channel setup and qualification time. A computer-controlled system was developed which allows an operator to set up, calibrate, and check out 40 channels of transient recording through a simple question-and-answer procedure in about one hour. The computer also digitizes the mag tape-stored analog data post test for quick-look plotting and further data reduction. A history of the whole procedure is maintained on disk files. 2 figures, 2 tables. (ERA citation 05:016414)

UCRL-52975 PC **A16**/MF **A01**
Lawrence Livermore National Lab., CA.
Analysis of Microcracks in Dry Polycrystalline NaCl by Ultrasonic Signal Processing.
F. M. Sears. Jul 80, 369p
Contract W-7405-ENG-48
Thesis.

The attenuation of energy and the change in shape of transient waveforms is a basic feature associated with the propagation of waves in crustal rocks. The dimensionless quality factor Q is observed as a useful quantity to characterize the attenuation of energy. Existing an elastic (attenuation) theories on the Q-determination problem are compared with experimental measurements to better understand rock properties. Experimental attenuation measurements were made on Avery Island (Louisiana) rock salt, Westerly (Rhode Island) granite, and Creighton (Ontario) quartz biotite gabbro. The attenuation mechanisms and how they affect the agreement between the an elastic theories were examined. Ultrasonic pulse methods were utilized of examine crack geometries as a function of frequency and thermal cycling temperature in dry polycrystalline rock salt. The attenuation of compressional (P) and shear (S) waves was studied in a thermally-induced, isotropic distribution of microcracks using ultrasonic-transmission techniques. These attenuation measurements led to the following series of generalities: ultrasonic or seismic attenuation depends on frequency in the rocks tested; thermal cycling of rock salt increases the porosity and attenuation; grain scattering seems to be the dominant loss mechanism at the higher frequencies in rocks; friction explains why the introduction of cracks into rock salt increases the attenuation; and attenuation appears to be independent of strain amplitude for low strains (10 exp -6) such as those associated with these measurements. Much work remains to be done to adequately describe the attenuation loss mechanisms and the an elasticity of rocks both experimentally and theoretically. (ERA citation 05:034049)

UCRL-84366 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Use of an Automated Mass Spectrometer for an Underground Coal Gasification Field Test.
R. W. Crawford, R. G. Bedford, C. M. Wong, H. R. Brand, and K. I. Kishiyama. Jul 80, 27p CONF-800732-1
Contract W-7405-ENG-48
International dynamic mass spectrometry symposium, Centerbury, UK, 7 Jul 1980.

A time-of-flight mass spectrometer was successfully used to analyze the product gas from an underground coal gasification field experiment. It proved to be precise and moderately accurate. It was extremely stable and reliable. Its speed was more than adequate for most requirements. A series of changes will be made to improve accuracy and detection limit. The analysis of product gas was fully automated, but any other operation took manual intervention. We plan to upgrade

the interface between the valves on the inlet system and the computer to allow reliable automatic operation. This will allow computer controlled reading of background and spectral calibration with pure gases, and quality assurance testing with a known gas mixture. Finally, we intend to increase sensitivity by installing an electrometer with computer selectable gain. This should allow us to quantify components such as argon down to 0.01% levels. (ERA citation 05:028330)

14C. Recording Devices

PB82-139254 PC **A02**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
Proposed Digital Cartridge Recording System for WRELADS.
Technical memo.,
T. R. Adams, and D. M. Phillips. Aug 81, 19p ERL-0210-TM, AR-002-617

The present data recording system in WRELADS II uses a hybrid tape recorder. Signal waveforms are recorded in analogue form while system parameters are recorded digitally. The hybrid recording system has several disadvantages that would be overcome by introducing a fully digital recording system. A proposal is described for developing a system to utilize two high-capacity digital cartridge recorders in conjunction with a microprocessor based cartridge controller.

14D. Reliability

AD-A108 150/4 PC **A04**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
'Bayesian' Reliability Tests Made Practical,
Anthony Coppola. Jul 81, 66p Rept no. RADC-TR-81-106

This report provides an understandable, easy to use and believable approach to 'Bayesian' Reliability Testing in order to encourage its practical application. It discusses advantages of the Bayesian approach, guidelines to selecting test risks, procedures for analyzing prior data and methods for structuring test plans. Sample requirements for invoking Bayesian test plans are included. (Author)

AD-A108 197/5 PC **A03**/MF **A01**
Air Force Academy, CO.
Failure-Free Reliability Tests.
Final rept.,
Nelson S. Pacheco, Salvatore J. Monaco, and Jerry A. Roberts. Sep 81, 34p Rept no. USAFA-TR-81-9

A failure-free reliability test is compared with a fixed-time test under a two-parameter Weibull failure distribution. The distribution of the length of the failure-free test is derived, along with conditional failure probabilities for items still operating at the end of the original burn-in time. Graphs are provided for calculating expected test length and conditional failure probabilities. (Author)

AD-A108 387/2 PC **A12**/MF **A01**
Reliability Analysis Center, Griffiss AFB, NY.
Nonelectronic Parts Reliability Data - 2,
Robert G. Arno. 1981, 258p Rept no. RAC-NPRD-2
Contract F30602-78-C-0281
Supersedes report dated 1978, AD-A059 901.

This report, organized in four major sections, presents reliability information based on field operation, dormant state and test data for more than 250 major nonelectronic part types. The four sections are Generic Data, Detailed Data, Application Data, and failure Modes and Mechanisms. Each device type contains reliability information in relation to the specific operational environments. (Author)

NUREG/CR-2211 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Modeling of Multiple Sequential Failures during Testing, Maintenance and Calibration.
Final rept.,
P. K. Samanta, and S. P. Mitra. Dec 81, 80p BNL-NUREG-51411

Dependent failures (also called common mode or common cause failures) and their quantitative description have received wide attention in nuclear safety analysis in recent years. In the second model, details of the process in multiple sequential failures are taken into account. The model increments the conditional failure probabilities by a certain amount from their lower bounds (independent failure prabability). This approach provides important insights into the influence of dependence between failures on system reliability. The model can be used effectively to choose an optimum system considering the individual failure probability, dependence factor and the amount of redundancy in a system.

NUREG/CR-2372 PC **A08**/MF **A01**
Kansas State Univ., Manhattan. Dept. of Nuclear Engineering.
Properties of Parameter Estimation Techniques for a Beta-Binomial Failure Model.
Final technical rept.,
J. K. Shultis, W. Buranapan, and N. D. Eckhoff. Dec 81, 167p KSU-2075B

Of considerable importance in the safety analysis of nuclear power plants are methods to estimate the probability of failure-on-demand, p, of a plant component that normally is inactive and that may fail when activated or stressed. Properties of five methods for estimating from failure-on-demand data the parameters of the beta prior distribution in a compound beta-binomial probability model are examined. Simulated failure data generated from a known beta-binomial marginal distribution are used to estimate values of the beta parameters by (1) matching moments of the prior distribution to those of the data, (2) the maximum likelihood method based on the prior distribution, (3) a weighted marginal matching moments method, (4) an unweighted marginal matching moments method, and (5) the maximum likelihood method based on the marginal distribution. For small sample sizes ($N = \text{or} < 10$) with data typical of low failure probability components, it was found that the simple prior matching moments method is often superior (e.g. smallest bias and mean squared error) while for larger sample sizes the marginal maximum likelihood estimators appear to be best.

NUREG/CR-2375 PC **A04**/MF **A01**
Kansas State Univ., Manhattan. Dept. of Nuclear Engineering.
SAFE-R and SAFE-D: Computer Codes for the Analysis of Failure Data.
Final technical rept.,
J. K. Shultis, N. D. Eckhoff, D. E. Johnson, and G. A. Milliken. Dec 81, 51p KSU-2075D

This user's manual presents a detailed description of two FORTRAN computer codes for analyzing component failure data. The first code SAFE-R is used to analyze data giving the number of observed failures in specified component operation times, while the second code SAFE-D is to be applied to failure data giving the number of failures observed in specified numbers of component demands. The theory behind the many analyses performed by these codes is summarized in a companion report NUREG/CR-2374 'Use of Non-Conjugate Prior Distributions in Compound Failure Models.' A description of the overall program structure and detailed use of the many program commands is presented here. A sample input is given along with the resulting output.

14E. Reprography

N82-13411/5 PC **A08**/MF **A01**
Allgemeine Elektricitaets-Gesellschaft AEG Telefunken, Warstein (Germany, F.R.).
Imaging Systems for Fast Electrophotographic Processes.
Final Report.
M. Lutz, B. Reimer, G. Baumann, H. Scheuermann, and H. Stausberg. Dec 80, 160p BMFT-FB-T-80-183, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Image carriers based on amorphous Se-alloys and inorganic-organic multilayer systems were developed for applications in fast electrophotographic processing. The combination of Se photoconductive layers doped with 0.5%. As or up to 15% Te with a strain reducing metallic interlayer on a flexible endless Ni-belt is demonstrated to provide the photographical quality and bending strength required by fast reprography. The addition of Te is shown to significantly extend the spectral sensitivity range. Thin flexible foils and belts can also be made out of multilayered systems using Se-alloys and polyrinylcarbazole. It is expected that it will be possible to extend the spectral sensitivity to the near infrared, thereby opening a new area of applications in communication and information systems.

15.
MILITARY SCIENCES

15C. Defense

AD-A108 263/5 PC **A14**/MF **A01**
Friends of the Earth, Inc., San Francisco, CA.
Energy Policies for Resilience and National Security.
Final rept.,
Amory B. Lovins, and L. Hunter Lovins. Oct 81, 322p
Contracts DCPA01-79-C-0317, EQ9AC016

The vulnerabilities of the U.S. energy system to accidental or deliberate disruptions are analyzed generically and specifically and shown to be disturbingly large. Since they arise from reliance on highly centralized technologies, increasing such reliance is likely to increase national energy vulnerability. A more efficient, diverse, dispersed, renewable energy system is shown to be inherently more resilient, to make major failures impossible, and to be compatible with consistent adherence to free-market principles. (Author)

AD-A108 525/7 PC **A03**/MF **A01**
Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD.
Model Validation Techniques.
Technical rept.,
Dwayne W. Nuzman, and Joseph K. Wald. Nov 81, 28p Rept no. AMSAA-TR-346

This report documents the development of some model validation techniques developed at AMSAA in the past several years. The methods of Monte Carlo band analysis and trend/spread plots are explained. Examples are provided and applications are discussed. (Author)

AD-A108 589/3 PC **A13**/MF **A01**
Verac, Inc., San Diego, CA.
An Analysis of MMCS Network Architectures to Support the Data Processing Requirements for Site Defense,
James C. Tiernan. 16 Dec 80, 278p Rept no. R-008-80
Contract DASG60-80-C-0017

As a part of the ADPSI effort, VERAC, Inc. has conducted a study of alternative network architectures for a distributed data processing (DDP) approach to implementation of the BMD Site Defense data processing subsystem. This report is the Final Report documenting the activities and conclusions reached in the study. The purpose of the VERAC study has been to develop and evaluate alternative distributed processing architectures for the BMD Site Defense Application. A number of architectures were to be assessed in this evaluation. These architectures include: (1) an advanced computer with a Centralized control and memory Architecture; (2) a Thread Architecture under study by McDonnel Douglas; and (3) a Hierarchical Architecture. VERAC has developed a model of the functional process supported by the Site Defense processor in order to perform the evaluation of alternative architectures. A preferred architecture has been identified.

AD-A108 593/5 PC **A02**/MF **A01**
Army War Coll. Strategic Studies Inst., Carlisle Barracks, PA.
Defense Priorities: The Urgent Issue.
Occasional paper,
John M. Weinstein. 10 Dec 81, 8p

The Reagan Administration's defense budget has been criticized by some as the Carter defense budget writ large. Since money for defense is not unlimited, the administration is called upon to consider carefully nonoperational political, economic, and social linkages to military policy; the decentralization of the international environment which limits American abilities to control its own destiny; and a redefinition of US perceptions, strategies, and force mixes. (Author)

15E. Logistics

AD-A108 228/8 PC **A15**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Mobility Bibliography.
Special rept.,
N. Liston, M. Hutt, and L. White. Nov 81, 333p Rept no. CRREL-SR-81-29

This bibliography is an international compilation of literature relating to terrain vehicles, amphibious vehicles, snow vehicles, air cushion vehicles, tracked vehicles, wheeled vehicles, and off-road vehicles. It also covers the related subjects of rolling resistance, traction, snow strength measurement, soil strength measurement, terrain analogs, vehicle models, and the overall topic of vehicle mobility. It is not comprehensive but begins at about 1970 and ends in 1980. The European coverage is lacking because much of this material is not accessible by computerized literature searching, which was the mechanism used for compiling this bibliography. (Author)

AD-A108 231/2 PC **A03**/MF **A01**
Southwest Research Inst., San Antonio, TX. Army Fuels and Lubricants Research Lab.
Fully Fueled POMCUS Vehicle Storage Test Program.
Final rept. Mar 78-Nov 80,
S. R. Westbrook, L. L. Stavinoha, and J. V. Mengenhauser. Jul 81, 38p Rept no. AFLRL-139
Contracts DAAK70-78-C-0001, DAAK70-80-C-0001

A laboratory and field test program was conducted to establish the feasibility of storing diesel-fueled vehicles in a fully fueled configuration. In March 1978, approximately twenty vehicles stored in a POMCUS (Prepositioned Overseas Materiel Configured to Unit Sets) humidity-controlled warehouse in the Federal Republic of Germany, fully fueled with NATO F-54 military diesel fuel. Selected vehicles contained additive-treated fuel, while the remaining vehicles contained untreated fuel for comparison purposes. The fuel additives used consisted of a multifunctional additive (corrosion inhibitor, dispersant, metal deactivator, and anti-oxidant) and a biocide. Samples were taken initially and at six-month intervals for analysis during 2-1/2 years of storage. Extensive laboratory evaluations of treated and untreated test fuels under controlled conditions showed a significant improvement in treated test fuel stability. Under field test conditions, differences between treated and untreated fuel were obscured by other variables such as sampling techniques and unknown initial condition of the fuel tanks. Results indicate that the fuel in the vehicles remained adequately clean and stable throughout the 30-month storage period. No fuel-related vehicle malfunctions occurred during termination of the test in November 1980.

AD-A108 245/2 PC **A06**/MF **A01**
Army Armament Materiel Readiness Command, Rock Island, IL. Decision Models Directorate.
Ammunition Distribution System for PROUD SPIRIT/MOBEX 80. Volume I.
Final rept. Oct 80-Aug 81,
Stuart W. Olson, and Norman H. Trier. Oct 81, 123p
DRSAR-DM-TR-10-81, SBI-AD-E700 006

This manual documents the Ammunition Distribution System (ADS) as developed for use in exercise Proud Spirit/MOBEX-80. Its purpose is to provide assistance in planning for surge or mobilization, assess plans, and provide operational assistance for mobilization exercises. Therefore, ADS can assess planned requirements (push) and walk-in requirements (pull) on a daily basis. The depot and port capability can be assessed according to predetermined constraints. This report contains a discussion of model methodology, data base development, interface requirements and the operator's guide.

AD-A108 401/1 PC **A03**/MF **A01**
George Washington Univ., Washington, DC. Program in Logistics.
A Closed Queueing Network Model for Multi-Echelon Repairable Item Provisioning.
Scientific rept.,
Donald Gross, Douglas R. Miller, and Richard M. Soland. 30 Jun 81, 28p Rept no. SERIAL-T-446
Contract N00014-75-C-0729

A closed queueing network model of a two-echelon, repairable item provisioning system is presented. It is desired to find the capacities of the base and depot repair facilities as well as the spares level which together guarantee a specified system service level at minimum cost. The stochastic process and the optimization procedure are of interest. (Author)

AD-A108 460/7 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Procurement, Logistics, and Readiness Div.
Planned Realinement of Fort Indiantown Gap, Pennsylvania.
21 Oct 81, 26p Rept no. GAO/PLRD-82-11
Report to the U.S. House of Representatives.

The Army's current study compares two realinement alternatives with Fort Indiantown Gap as it is now operating. Alternative I, the Army's preferred option, proposes terminating active Army operation of Fort Indiantown Gap, transferring installation control to the Commonwealth of Pennsylvania, and assigning to Fort Meade, Maryland, the mission of providing logistical and administrative support to Reserve units in the geographical area. Alternative II proposes reducing Fort Indiantown Gap to a subordinate installation of Fort Meade and transferring most Reserve unit support to Fort Meade. The Army estimates that implementing alternative I would result in one-time costs of $1.3 million and annual savings of $3.3 million and that implementing alternative II would result in one-time savings of $1.2 million and annual savings of $2.7 million. Despite miscellaneous errors, omissions, and questionable procedures in the Army's current study, we believe that savings are possible if the Army chooses either of the two proposed alternatives. On the basis of our review, we estimate that under alternative I, the Army would incur one-time costs of $5.6 million and would save $2.1 million annually. Under alternative II, we estimate that the Army would incur one-time costs of $2.9 million and would save $2.2 million annually.

AD-A108 495/3 PC **A03**/MF **A01**
Southwest Research Inst., San Antonio, TX. Army Fuels and Lubricants Research Lab.
Listing of Army Fuel-Consuming Nonautomotive Ground Support Equipment.
Interim rept. May 80-Jul 81,
R. A. Alvarez, and E. C. Owens. Aug 81, 42p Rept no. AFLRL-141
Contract DAAK70-80-C-0001

The records and publications of the U.S. Army Material Development and Readiness Command (DARCOM) were surveyed. From these documents, a list of the nonautomotive, ground-support, fuel-consuming equipment was compiled. This listing contains the line item number, national stock number, nomenclature, fuel type used, fuel consumption, and responsible command for each equipment item. This listing is included in this document and was also supplied to MERADCOM, DRDME-EM on a computer-readable magnetic tape. (Author)

AD-A108 648/7 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
The Air Force Acquisition Logistics Division (AFALD): Relationship of Aspects of Manpower to Mission Performance.
Master's thesis,
Thomas S. Gregg, Jr., and James T. Ronaghan, Jr. Jun 81, 115p Rept no. AFIT/LSSR-44-81

This thesis serves as a basis for determining percentage-based advanced academic degree personnel requirements within the large and diverse Air Force Acquisition Logistics Division (AFALD). The scope of this thesis was limited to an examination of AFALD manpower requirements and their relation, if any, to meeting AFALD organizational goals. This research effort attempted to determine if the AFALD could be recommended for use as the subject organization for study of an advanced academic degree percentage-based system. The authors concluded that the AFALD could be recommended for study. (Author)

AD-A108 689/1 PC **A03**/MF **A01**
Logistics Management Inst., Washington, DC.
A Critique of the DoD Materiel Distribution Study,
Louis Miller, Marshall Fisher, and John Muckstadt. Mar 79, 44p Rept no. LMI-ML810
Contract MDA903-77-C-0370

This study reviews the methodology and assumptions employed in the DoD Materiel Distribution System (DoDMDS) Study. The purpose of the review was to determine if the results of the DoDMDS Study establish a firm basis for action by the Secretary of Defense. Study findings suggest that a conclusive case has not been made for the claimed savings. The inappropriate use of the modeling tools, the ill advised and unnecessary over simplification, and the omission of significant cost considerations all contribute to this conclusion. (Author)

AD-A108 697/4 PC **A12**/MF **A01**
Air Force Systems Command, Washington, DC.
Digest of Decisions; Allowable Costs under the Defense Acquisition Regulation.
Interim rept. Jan 79-Jan 80,
Chester D. Taylor, Jr. Jan 80, 272p Rept no. AFSC-TR-81-68
Supersedes all earlier editions.

This is the fourth edition of this publication and supersedes all earlier editions. The purpose of this publication, as with the previous editions, is to provide assistance to military and civilian attorneys of the Air Force in their research of questions involving the allowability or nonallowability of costs under Air Force contracts. To facilitate the use of the body of legal precedent which the decisions digested herein represent, they have been keyed to each of the sections of the DAR, and a table of all cases cited in the digest arranged alphabetically has been attached.

AD-A108 736/0 PC **A07**/MF **A01**
BDM Corp., Vienna, VA.
A User's Guide for LOGATAK. A Simulation Model to Analyze Logistic Network Distribution and Interdiction,
E. J. Bitinas, and W. F. Lynch, Jr. 15 Apr 81, 132p
BDM/W-81-079-TR, DNA-6505H
Contract DNA001-79-C-0086

This user's guide describes the LOGATAK computer simulation model and its applications. The model is a transportation network simulation by which logistics and combat forces are moved throughout a theater of operations. Interdiction strategies are tested using the model to determine vulnerabilities in the transportation system and evaluate the effectiveness of interdiction against forces and resupply. The model was originally developed in 1977 by the BDM Corporation based on the MAWLOGS (Model of the Army Worldwide Logistics) modeling system. Since then, a number of improvements and enhanced capabilities have been made, resulting in an effective interdiction analysis tool. (Author)

AD-B057 417/8 PC **A03**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Congressional Preceptions of the Army's Materiel Acquisition Process.
Study project,
James D. Delk. 16 May 80, 33p
Distribution limitation now removed.

The study was undertaken to determine Congressional perceptions of the Army's materiel acquisition process, including the interface between Army representatives and the Congress, especially as compared to the other services. The research technique was the use of structured interviews. Thirty-one legislators and staff in the Armed Services Committees and Defense Subcommittees of the Appropriations Committees in both houses of Congress were interviewed. The Congressional perception is that the Army can and should be doing a better job with materiel acquisition in spite of

the external factors acknowledged as impacting on the process. Primary complaints centered on the length of the process. In addition, the Army needs to improve its interface techniques with the Congress, especially in the establishment and nurturing of personal relationships. Finally, the Army is indicted for manifesting less candor and forthrightness than the other services. (Author)

15F. Nuclear Warfare

SAND-79-8260 PC **A04**/MF **A01**
Sandia Labs., Livermore, CA.
SIXDOF: A Computer Program for Trajectory Simulation of Ballistic Flight Vehicles.
R. N. Everett. Oct 79, 72p
Contract EY-76-C-04-0789

The report presents the trajectory computer program, SIXDOF. The program has been in use at Sandia Laboratories, Livermore, for flight simulation of ballistic flight vehicles and has served as an important design tool. The report includes a presentation of the prominent features of the mathematical model which describes the vehicle aero- and flight dynamics. Additionally, detailed descriptions of the program input and output are provided as a user's guide. (ERA citation 05:004877)

UCRL-50016-80-2 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Mechanical Engineering Department Technical Review.
W. B. Sirnecka, R. M. Denney, and C. Talaber. 1 Jul 80, 93p
Contract W-7405-ENG-48

The Mechanical Engineering Department Technical Review is published to inform the readers of various technical activities within the department, to promote an exchange of ideas, and to give credit to the personnel who are achieving the results. The report is formatted into two parts: technical achievements and publication abstracts. The first is divided into 8 engineering divisions, i.e., nuclear test, nuclear explosives, weapons, energy systems, research, materials, magnetic fusion, and materials fabrication. The names of the personnel and the division accomplishing specific work are provided. (ERA citation 06:004101)

15G. Operations, Strategy, and Tactics

AD-A108 273/4 PC **A04**/MF **A01**
R and D Associates, Marina del Rey, CA.
Handbook for the Analysis of Engagements with Mobile Targets.
1 Jun 80, 66p RDA-TR-112920-003, DNA-5382H
Contract DNA001-80-C-0079

This document describes a methodology and provides the data required for a realistic analysis of a mobile target engagement. For this report a mobile target is defined both as a target that moves nearly continuously (such as a tank company) and as one that moves only occasionally (such as an artillery battery or command post). Specifically, this manual provides a means of estimating the probability that a target is still present at an observed location as a function of time from the observation where the time the target stopped is unknown. With this methodology targets can then be evaluated not only on the basis of expected fractional coverage as in the manuals, but also on the basis of whether there is an adequate likelihood that they will still be present when a weapon arrives.

AD-A108 315/3 PC **A14**/MF **A01**
CACI, Inc.-Federal, Arlington, VA.
Divisional Electronic Warfare Combat (DEWCOM) Model - User Manual.
Final rept. Apr 79-Jul 80,
Robert T. Campbell, and Ross S. Fairbrother. Sep 80, 310p CAA-D-80-5
Contract DAAK21-79-C-0057
See also Rept. nos. CAA-D-80-4, CAA-D-80-6 and CAA-D-80-7.

This document is a manual to assist military and operations research analysts in the use of the Divisional Electronic Warfare Combat (DEWCOM) computer simulation model. the DEWCOM Model is a two-sided stochastic combat simulation model which focuses upon tactical communications and electromagnetic intelligence/threat acquisition systems and the electronic warfare (EW) directed against those systems. To accomplish this, the model is driven by conventional tactical engagement betwwen a blue maneuver force against a red maneuver force. Each side consists of realistically deployed ground and close air support forces that include maneuver units, EW units, artillery units, and support units. The tactical war is driven by a set of orders that may direct units to attack, defend, move, delay or withdraw. As units begin to take tactical actions, messages are triggered which are transmitted over explicitly modeled communication links. The successful completion of these message transmissions is necessary for units to respond in the desired manner. Intelligence is gathered through direct observation of units in contact, radars, and from messages that flow between units. Increases in intelligence can in turn cause messages to be generated which may be sensed or acted upon. As messages are being transmitted over the communications facilities of one side, they are subject to being sensed by the opposing side.

AD-B057 418/6 PC **A04**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Ultra in the Battle of Britain: the Real Key to Sucess.
Study project,
Tommy J. Smith. 18 May 80, 74p
Distribution limitation now removed.

The basic question is whether or not Ultra intelligence contributed more to the British victory in the Battle of Britain than other sources of intelligence. Possible future uses of the historical lessons learned are examined. Data was gathered through an extensive literary review, a trip to England, and personal interviews with British authorities on the subject. The role of Ultra in the Battle of Britain was significant to the outcome of the battle; however, insufficient evidence exists to determine if it was more important than other sources of intelligence. Radar and lower-grade radio intercepts also made a significant contribution; thus, until more Ultra files are declassified and released to the Public Record Office, final determination of findings must be held in abeyance. However, numerous lessons learned are applicable to the United States' current domestic and international situation. Actions to be taken include: continuation of study when appropriate Ultra files are released; development of SIGINT means should be given highest priority; reduce military use of radios and 'secure' devices; improve collation of strategic and tactical intelligence--provide to division level; improve COMSEC; acquaint military and national leaders with lessons of the Battle of Britain; immediately improve CONUS air defense; most importantly, review and update contingency plans for defense of CONUS. (Author)

16. MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

AD-A108 618/0 PC **A05**/MF **A01**
Department of the Air Force, Washington, DC.
Environmental Impact Analysis Process. Deployment Area Selection and Land Withdrawal/Acquisition DEIS. Chapter I. Program Overview.
Dec 80, 97p
See also Chapter 2, AD-A108 619.

Soviet missile developments are making our land-based intercontinental ballistic missiles (ICBMs) increasingly vulnerable. To improve deterrence against hostile actions against the United States, the U.S. Air Force proposes to deploy 200 mobile M-X missiles in a survivable multiple protective shelter (MPS) basing mode. The system will include two operating bases, 4,600 shelters, approximately 8,500 miles of roads, and related support facilities, operated and maintained by about 13,000 people. The first 10 missiles are to be operational by mid-1986, and the system is to be fully operational by the end of 1989. Major decisions to be made are selection of a deployment area or areas and two operating base locations from areas identified as suitable in Nevada, Utah, Texas, and New Mexico. Land withdrawal/acquisition could begin in 1981 and construction of initial facilities in 1982. (Author)

AD-A108 619/8 PC **A07**/MF **A01**
Department of the Air Force, Washington, DC.
Environmental Impact Analysis Process. Deployment Area Selection and Land Withdrawal/Acquisition DEIS. Chapter II. Comparative Analysis of Alternatives.
Dec 80, 134p
See also Chapter 3, Part 1, AD-A108 620. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This chapter identifies all reasonable alternatives and objectively presents the project effects and environmental consequences of the Proposed Action and each alternative. The process by which alternative deployment areas and configurations were derived is presented first, followed by the projected construction and operation resource requirements for the Proposed Action and each alternative. The future conditions within the alternative deployment areas under no project, or no deployment decision at this time, are summarized for each key resource. The scoping process identified key resources in both natural and human environments. In response to the public and agency comments, each resource is evaluated for each alternative and appropriate mitigations are discussed. The analysis covers significant environmental characteristics that could be substantially affected by system deployment. The interdisciplinary analysis identifies potential mitigation conflicts. This detailed resource-by-resource analysis defines the issues and permits reviewers to evaluate the comparative merits of the Proposed Action and each alternative for each significantly affected resource. At the conclusion of the resource analysis for the Proposed Action, the available data, results of analyses performed, and scientific judgment were used to rank, where possible, each alternative relative to the resource under consideration. (Author)

AD-A108 622/2 PC **A12**/MF **A01**
Department of the Air Force, Washington, DC.
Environmental Impact Analysis Process. Deployment Area Selection and Land Withdrawal/Acquisition DEIS. Chapter IV. Part I. Environmental Consequences to the Study Regions and Operating Base Vicinities.
Dec 80, 273p
See also Chapter 4, Part 2, AD-A108 623. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The resources which are analyzed in this chapter were identified on the basis of (a) scoping meetings which the Air Force conducted with state and federal agencies and the public and (b) a professional interdisciplinary review of the ten general environmental issues which had been identified. These issues are: rapid, large-scale growth; land use/land rights; water resources; public health; archaeological and historical resources; energy and nonrenewable resources; terrestrial and aquatic biology; air quality; Native Americans; and construction resources. (Author)

AD-A108 623/0 PC **A15**/MF **A01**
Department of the Air Force, Washington, DC.
Environmental Impact Analysis Process. Deployment Area Selection and Land Withdrawal/Acquisition DEIS. Chapter IV. Part II. Environmental Consequences to the Study Regions and Operating Base Vicinities.
Dec 80, 334p
See also Chapter 4, Part 3, AD-A108 624.

Deployment of the M-X system in sparsely populated areas of the southwestern United States will produce rapid, large-scale changes in the character of the human environment of these deployment regions. Effective operation of the M-X system requires a deploy-

ment region containing relatively few human inhabitants. Yet construction and operation of the system will result in the introduction of large numbers of people into the rural, thinly-settled deployment region. This rapid growth in population resulting from the large labor and materials demands of the project will cause significant changes in the economic and social structures of the rural deployment areas. In some cases, M-X deployment would transform deployment-region communities from slow-growing or declining communities of a few thousand population or smaller into active regional population centers of 20,000 persons or more. This would be the case for the communities adjacent to the M-X operating bases. Other areas would undergo a decade of 'boom-bust' construction growth similar to that caused by energy developments throughout the western United States. The economic, social, and local government impacts of M-X deployment have been estimated quantitatively using a series of inter-related models and computational algorithms. The direct economic effects on the regions are estimated from a given set of M-X project characteristics such as direct employment and material requirements. The indirect economic effects on the M-X are estimated using country-level interindustry-type models and the best available baseline projections for the localities studied. (Author)

AD-A108 624/8 PC **A13**/MF **A01**
Department of the Air Force, Washington, DC.
Environmental Impact Analysis Process. Deployment Area Selection and Land Withdrawal/Acquisition DEIS. Chapter IV. Part III. Environmental Consequences to the Study Regions and Operating Base Vicinities.
Dec 80, 286p
See also Chapter 5, AD-A108 625. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The M-X program would require electrical power and fuels of various forms supplied on both a relatively short term (2-5 years) for construction needs and a longer term (about 30 years) for operational requirements. At a time of diminishing energy supplies and increasing competition for energy, including gasoline, the potential effect of the project on energy resources must be considered. Possible effects on electrical power resources include increased power generation plant operation with the attending potential impacts on air quality, water consumption, wastewater generation, and disposal of fuelgas scrubbing sludges, and ash. Power transmission and distribution systems may have to be built in order to provide service to remote areas or to be upgraded to meet increased demands. The associated right-of-way acquisition and maintenance may preclude the use of affected land for other purposes. New lines and substations could have an adverse visual and aesthetic impact. Finally, the extensive cable plowing or trenching required for installation of the underground cables for power distribution to the clusters would have a temporary disruptive effect. (Author)

AD-A108 625/5 PC **A08**/MF **A01**
Department of the Air Force, Washington, DC.
Environmental Impact Analysis Process. Deployment Area Selection and Land Withdrawal/Acquisition DEIS. Chapter V. Appendices.
Dec 80, 167p
See also Chapter 1, AD-A108 618.

This paper describes the process used to select reasonable basing areas for M-X, concentrating on recent evaluations which led to the selection of two potential basing areas of further study. The selection process began in 1977 with consideration of the entire continental United States. This initial work surveyed basing needs, screened possible areas for M-X deployment, and finally identified six potential basing areas for deployment of M-X in Multiple Protective Shelters (MPS). Maps and descriptions of these areas are included in Appendix A. Previous criteria were augmented with military and operational considerations in order to identify which, if any, of the six potential basing areas were unreasonable to pursue.

UCID-18833 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Review of ARAC'S Involvement in the Titan II Missile Accident.
T. J. Sullivan. Oct 80, 44p
Contract W-7405-ENG-48

The Atmospheric Release Advisory Capability (ARAC) response to the Titan II accident near Damascus, Arkansas on 19 September 1980 entailed 12 personnel for periods ranging from 2 to 12 hours. The first call was a NEST Standby alert at 0415L (PCT), followed by a request for dispersal calculations at 0615L, personnel callout at 0630L, crude estimates of plausible source term scenarios at 0845-0900L, first model calculations at 1130L and final model calculations at 1500L. While several new firsts were recorded for ARAC, demonstrating expanded capabilities for NEST-type responses, time lines were very long, essential information was very scant to non-existent, and useful communication of final calculations to the accident site impossible. A detailed chronology is found in Appendix A and a list of acronyms and abbreviations is contained in Appendix B. (ERA citation 06:005489)

16B. Missile Trajectories

AD-A108 592/7 PC **A02**/MF **A01**
Alabama Univ. in Huntsville. School of Science and Engineering.
Implementation of an Overlaid Version of PII Simulation.
Technical rept.,
Steven Mann, and David Cobb. Jul 81, 19p DRSMI/RD-81-18-TR
Contract DAAH01-81-D-A006

The techniques for implementing a very large PERSHING II digital simulation on a Perkin Elmer minicomputer are discussed in this report. The simulation was broken into subunits and overlaid. A summary is given on the software requirements for operating the simulation. (Author)

16D. Missiles

AD-A108 265/0 PC **A05**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
Mesh Efficiency of the Integrated Safe/Arm Device of the Pershing II Missile System.
Frederick R. Tepper. Nov 81, 98p ARLCD-TR-81020, SBI-AD-E400 711

This report describes the results of an analytical study of the minimum point efficiencies of the gear meshes of the integrated safe/arm device (ISAD) of the Pershing II missile system. It expands earlier work on gear mesh efficiency by considering the possibility of involute meshes which have a non-unity contact ratio. Conclusions concerning the mesh efficiency as a function of the coefficient of friction, the presence of undercutting of the involute pinions, and the contact ratio of the involute meshes are presented. The analyses on which these results are based are given in detail in the report.

N82-13046/9 PC **A06**/MF **A01**
Nielsen Engineering and Research, Inc., Mountain View, CA.
Consolidation of Data Base for Army Generalized Missile Model.
Final Report.
D. J. Klenke, and M. J. Hemsch. Aug 80, 101p
NASA-CR-166273, NEAR-TR-221
Contract NAS2-10081

Data from plume interaction tests, nose mounted canard configuration tests, and high angle of attack tests on the Army Generalized Missile model are consolidated in a computer program which makes them readily accessible for plotting, listing, and evaluation. The program is written in FORTRAN and will run on an ordinary minicomputer. It has the capability of retrieving any coefficient from the existing DATAMAN tapes and displaying it in tabular or plotted form. Comparisons of data taken in several wind tunnels and of data with the predictions of Program MISSILE2 are also presented.

N82-13110/3 PC **A15**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Pressure Distributions on Three Different Cruciform Aft-Tail Control Surfaces of a Wingless Missile at Mach 1.60, 2.36, and 3.70. Volume 1: Trapezoidal Tail.
M. Lamb, W. C. Sawyer, D. L. Wassum, and C. D. Babb. Aug 79, 345p NASA-TM-80097, L-12993-V-1

The results of pressure distribution tests conducted in a wind tunnel are presented without analysis. The data were obtained for trapezoidal aft tail control surfaces on a wingless missile model at Mach numbers of 1.60, 2.36, and 3.70 for angles of attack from -4 to 20 deg model roll angles from 0 to 90 deg and tail deflections of 0 and -15 deg. The test Reynolds number used was 6.6 million per meter.

N82-13779/5 PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
A Comparison of Three Programs for the Calculation of Surface-Ratio en Jaemfoerelse AV Tre Program Foer Beraekning AV 'Ytfoerhaallanden'.
P. Svensson. Dec 80, 31p FOA-C-20392-D8
Text in Swedish.

For the calculation of splinter effect on a given cylindrical target struck by a missile, two methods have been used for several years with the VERSAM program. A method for the same geometrical problems and for use in a version of the artillery efficiency model (AVM) is discussed. The three methods were developed to meet different requirements. The accuracy of the three methods is compared. The facit-method, developed for this comparison, is a severely tested extension of the above mentioned AVM-computer program.

17.

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A108 275/9 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Distributed Sensor Networks.
Semiannual technical summary rept. 1 Oct 80-31 Mar 81,
Richard T. Lacoss. 31 Mar 81, 71p ESD-TR-81-210
Contract F19628-80-C-0002, ARPA Order-3345

This Semiannual Technical Summary reports work in the Distributed Sensor Networks program for the period 1 October 1980 through 31 March 1981. Status of the development and deployment of the DSN acoustic test bed and implementation of a real-time DSN capability using the test bed are reported. DSN communication requirements have been reviewed and a preliminary design has been completed for a communication channel structure and for protocols to provide the needed services. Simulation and analytical results have been obtained confirming the performance of the proposed distributed random-access scheme for local broadcast. Progress is reported on design studies directed toward an advanced nodal processor and software design and development efforts directed toward solving problems associated with distributed software systems. (Author)

AD-A108 285/8 PC **A05**/MF **A01**
Naval Research Lab., Washington, DC.
Sonar Transducer Reliability Improvement Program (STRIP) FY81.
Quarterly progress rept. no. 4,
R. W. Timme. 1 Oct 81, 97p Rept no. NRL-MR-465

Four coating materials have shown the ability to increase the electrical lifetime of PZT ceramic. A strong recommendation was made that Humiseal 2A53 be used for an insulating coating material on the PZT ceramic in the AN/SQS-56 transducer instead of the Conap EN-2 used previously. Long-term water permeation experiments give initial indications that sodium chloride is not carried through the transducer elastomer. The composition of the elastomer is not significantly affected. DI water does not reach a steady state equilibrium permeation rate. However, it has been shown that drastic electronic changes in transducers caused by high temperature, humid aging can be nearly completely nullified by a thorough drying. An improved transducer has been developed and demonstrated as superior to the TR-122 (BQC-1). All performance specifications, before and after explosive shock, have been met. Recommendations are made for improving the reliability and performance of the DT-276 hydrophone. (Author)

AD-A108 389/8 PC **A03**/MF **A01**
Sparton Electronics, Jackson, MI.
Modified Ambient Sea Noise Indicator with Ambient Noise Directionality Estimator.
Final technical rept. 1 Jan-31 Aug 81,
William Ezell. 30 Oct 81, 32p Rept no. SPARTON-7723-A003(F)
Contract N62269-81-C-0306

The modified Ambient Sea Noise Indicator (ASNI) ID-1872/A MOD which includes an Ambient Noise Directionally Estimator (ANODE) function, provides a comparison of the omnidirectional noise level and the summed noise levels of the two directional channels of a VLAD AN/SSQ-77 sonobuoy when in the ANODE mode. The omnidirectional ASNI absolute noise level can also be read for specific frequencies at the hydrophones of passive omnidirectional sonobuoys without automatic gain control when the modified unit is in the ASNI mode. Passive sonobuoys, located in the sea, will pick up sea noise with pressure-sensitive hydrophones. If the sonobuoy is an AN/SSQ-57, one omnidirectional hydrophone is used. If an AN/SSQ-77 sonobuoy is used, a vertical multielement array of hydrophones provides directional as well as omnidirectional information. The sea noise is transmitted to a receiver in the aircraft. The demodulated signal from the receiver is applied to the indicator. The ASNI and ANODE mode levels are indicated on the front panel meter, which is calibrated in decibels in a 1-Hz band relative to 1 microPascal sq for the omnidirectional noise level and in decibels for the directional channel to omnidirectional channel noise difference. The ambient sea noise levels may be used to plot a graph of ambient sea noise. The ANODE gain may be used to evaluate the effectiveness of the VLAD sonobuoy under various sea states.

AD-A108 428/4 PC **A03**/MF **A01**
Naval Air Development Center, Warminster, PA. Sensors and Avionics Technology Directorate.
User's Manual for the Buoy-Cable-Body Computer Program CABUOY.
Final rept.,
John P. Brett. 21 Sep 81, 39p Rept no. NADC-80174-30

CABUOY is a Fortran IV program. The program solves for the two-dimensional dynamic motions of a cable suspended system deployed in an ocean environment. Intended as an engineering tool, the program can model any combination of cable segments and attached bodies configured as either a towed, moored, or free drifting system. The positions of all bodies and the resultant cable tensions are calculated as functions of time. This time domain approach, though more costly in terms of execution time than the more common frequency domain method, was chosen because it allows for the solution of transient motions which may induce high tension loads in the cable. The program employs a finite element analysis to model the cable-body system. The resultant differential equations are integrated using a Kutta-Merson routine which automatically reduces the integration time step until specified error criteria are met.

AD-A108 448/2 PC **A03**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Technical Support Directorate.
Acoustic Targeting System for Off-Axis Firing.
Final rept. Jan 75-Dec 80,
D. E. Fredericks. Nov 81, 26p ARTSD-TR-81003, SBI-AD-E400 729

A new concept for target scoring for small caliber weapon systems has been developed, and a prototype target scoring system was installed at the Ware Simulation Section test ranges, Rock Island, Illinois. This system uses acoustic principles for detecting and target scoring supersonic projectiles. Previously, acoustic systems required that the path of the projectile be perpendicular to the target plane. The prototype system at the Ware Simulation Section uses a new dual-rod concept developed by Accubar Engineering that does not require the path of the projectile to be perpendicular to the target plane. This unit allows accurate target scoring of projectiles fired from a test platform that may be moving in combined yaw-and-pitch motion.

AD-A108 476/3 PC **A05**/MF **A01**
Science Applications, Inc., McLean, VA.
Improved Approach for Modeling Acoustic Fluctuations.
Final rept.,
R. C. Cavanagh, and W. W. Renner. Oct 79, 91p Rept no. SAI-80-104-WA
Contract N00014-78-C-0603

The Navy relies on sonar-system performance predictions for many applications -- from concept and design through direct Fleet tactical aids. Each application involves a specific amount of ensembling over conditions and requires a certain level of accuracy. Performance predictions are usually generated through detection or tracking simulations, employing computer models for engagements between targets and sensors. Whether a Monte Carlo or analytic approach is used, the statistical results depend principally on the scenario, the system response and the acoustic environment. This study concentrates on the last item, the environmental acoustic (EVA) parameters and their fluctuations, and how it impacts performance-prediction capability.

AD-A108 594/3 PC **A05**/MF **A01**
General Electric Co., Syracuse, NY. Undersea Electronics Programs Dept.
Data Association in an Ocean Environment.
Final rept. 15 Jul 79-15 Dec 80,
Vincent T. Gabriel, Robert D. Berlin, and Yaakov Bar-Shalom. 14 Sep 81, 94p
Contract N00014-79-C-0528

A multisensor data association technique was developed utilizing an expected likelihood approach to link time discontinuous tracks or those simultaneously held by multiple sensors. Nonlinear propagation loss/detection performance, prior target speed/heading distributions, gaussian measurement errors and frequency spectrum comparison are included in the resulting algorithm. Single/multiple lookback techniques are used for link decisions. The technique is considered practical for the low data rates typical of ASW. (Author)

AD-A108 714/7 PC **A02**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
Hardware Dynamic Beamforming.
Summary rept.,
W. S. Hodgkiss, and V. C. Anderson. 19 Aug 80, 13p Rept no. MPL-U-42/80
Contract N00014-75-C-0749
Pub. in Jnl. of the Acoustical Society of America, v69 n4 p1075-1083 Apr 81.

No abstract available.

PATENT-4 282 585 Not available NTIS
Department of the Navy, Washington, DC.
Site Occupancy Detector.
Patent,
Steve F. Torok, Vincent A. Formica, and George P. Lange. Filed 25 Oct 73, patented 4 Aug 81, 7p AD-D009 029/0, PAT-APPL-408 970
Supersedes PAT-APPL-408 970-73, AD-D008 022.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to an acoustic system for covertly detecting surface to air missile (SAM) sites by monitoring for noise emitted by the electrical power generated at the sites. The output of a microphone is sharply filtered around 75 Hz and a phase lock loop locks onto the signal and tracks slight deviations. By timing logic, signals of at least 7 minutes duration with interruptions of 10 seconds or less are considered SAM targets.

17B. Communication

AD-A108 138/9 PC **A02**/MF **A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
Engineering Intelligibility Testing of Voice Communication Equipment.
Final rept. on test operations procedure.
19 Nov 81, 15p Rept no. TOP-6-2-521
Supersedes Rept. no. MTP-6-2-521 dated 6 Aug 70, AD-876 257.

This engineering test procedure describes engineering test methods for evaluating the intelligibility of voice communication equipment. It addresses two types of testing, phonetically balanced word list testing and automatic testing by means of the Voice Intelligibility Analysis System. (author)

AD-A108 154/6 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Development of a Low Data Rate Repeater.
Final rept.,
Hans Laping. 30 Jan 81, 26p Rept nos. AFGL-TR-81-0019, AFGL-IP-298

This report describes a 40 MHz to S-Band data repeater developed to increase the radio horizon for high altitude scientific balloon flights launched from Holloman AFB in New Mexico. (Author)

AD-A108 202/3 PC **A03**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
Test and Evaluation of Reduced Rate Multiplexers.
Rept. for Jan-Dec 80,
John Evanowsky. Aug 81, 38p Rept no. RADC-TR-81-163

This report contains the results of a test and evaluation utilizing commercially available Reduced Rate Multiplexers performed by RADC's Digital Communication Experimental Facility (DICEF) in support of DCA/DCEC. Unlike previous work in this area, the subject program considered the effect of an analog telecommunications channel prior to digitization by a Continuously Variable Slope Delta Modulation (CVSD) encoder. The major conclusion drawn from this evaluation is the fact that a system incorporating a 32 KB/S CVSD in tandem with a conventional analog telephone channel of relatively poor quality can support 2400 B/S modem transmission.

AD-A108 203/1 PC **A03**/MF **A01**
IIT Research Inst., Chicago, IL.
An Assessment of the Magnitude of Electromechanical Failures Occurring Within Air Force Command, Control, Communications, and Intelligence (C3I) Systems.
Final rept. 1 Aug 80-31 May 81,
John E. Short. Oct 81, 42p RADC-TR-81-267
Contract F30602-78-C-0281

The failure of mechanical or electromechanical components in systems and equipment does not have a direct bearing upon the operational reliability and the logistic support costs. The basic objective of this assessment was to obtain and review all readily available historical and statistical data on selected C3I systems and components. The second was to obtain through structured but informal discussions the opinions and observations of qualified experts in each phase of system planning, research, development, acquisition, operations and logistic support of C3I systems.

AD-A108 324/5 PC **A04**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
The Assessment of Speech Quality.
Technical rept.,
R. S. Nickerson, and A. W. F. Huggins. Feb 77, 71p Rept no. BBN-3486
Contract MDA903-75-C-0180

Various methods that have been used to assess the quality of speech are reviewed. These methods are organized under three general topics: unidimensional quality assessment, judging of individual speech qualities, and multidimensional scaling. The importance of effects attributable to speech material, talkers and listeners is emphasized. The desirability of objective measures of speech quality is noted and some candidate measures are discussed. Finally, the relationship between quality assessment and intelligibility testing is briefly considered. (Author)

AD-A108 325/2 PC **A04**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Command and Control Related Computer Technology. Part I. Packet Radio. Part II. Speech Compression and Evaluation.
Quarterly progress rept. no. 9, 1 Dec 76-28 Feb 77,
M. Beeler, J. Burchfiel, R. S. Nickerson, R. Viswanathan, and J. Makhoul. Mar 77, 67p Rept no. BBN-3520
Contract MDA903-75-C-0180, ARPA Order-2935

This document describes progress on (1) the development of a packet radio network, and (2) speech compression and evaluation. Activities reported under (1) includes work on Station Software and Internetworking Research and Development; under (2) comparative informal evaluation of our perceptual-model-based variable frame rate scheme for transmitting LPC data with two other schemes under a number of vocoder conditions; development and testing of a new scheme for variable rate transmission of LPC gain parameter; and completion of the initial analysis of our recent factorial subjective speech quality study. (Author)

AD-A108 336/9 PC **A08**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Queuing Analysis of a Shared Voice/Data Link.
Doctoral thesis,
Daniel Uri Friedman. Nov 81, 165p Rept no. LIDS-TH-1161
Contract N00014-75-C-1183, ARPA Order-3045

We consider a link shared by some number of off-hook phone callers and a data queue. The allocation of capacity to voice and data depends on the level of speaker activity (number of talkspurt). A Markov chain model is adopted for this activity, and the resulting data queue performance is analyzed. (Author)

AD-A108 337/7 PC **A07**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Multiple Access Communication: The Finite User Population Problem.
Doctoral thesis,
Michael Gene Hluchyj. Nov 81, 146p Rept no. LIDS-TH-1162
Contract N00014-75-C-1183, ARPA Order-3045

The multiple access problem is one of organizing a population of users so that they may efficiently share the resources of a single communication channel. This problem is examined under the modeling assumptions of a finite user population and a time-slotted channel with limited feedback. Techniques or schemes for coordinating the transmissions of users are called multiaccess protocols. Simple relationships among common steady-state measures of protocol performance (including throughput and average delay) are derived. From these relationships it is shown that the performance measures are equivalent in the sense that (1) each may be expressed as a simple function of any one of the others and (2) a protocol which is optimal with respect to any one measure is optimal with respect to the others. The derived relationships are also used in the performance analysis of perfect scheduling and TDMA. In the area of protocol development, four related classes of multiaccess protocols are defined and examined. The most general class of protocols is considered first, and the other three are subclasses of it. For each class the problem of finding an optimal protocol is characterized. The optimization problem is formulated as a Team problem for the first class, and as a Markov decision problem for each of the other three classes. However, only with the last class examined, the Window protocols, does the optimization problem prove to be tractable. Using results from Markov decision theory, optimal Window protocols are derived for the cases of two and three users.

AD-A108 394/8 PC **A12**/MF **A01**
Harris Corp., Melbourne, FL. Government Communication Systems Div.
Fiber Optic Data Bus for the AN/GYQ-21(V).
Final technical rept. 23 Jul 79-23 Oct 80,
R. E. Dragoo, and D. B. Kimsey. Jun 81, 261p RADC-TR-81-153
Contract F30602-79-C-0218

This report describes the application of fiber optic bus technology to the AN/GYQ-21(V) system with the goal of providing for increased separation distances between peripherals and increased long distance data transfer rates. The ring network and the transmissive star network are described as implementable fiber optic busses which can provide for the following enhancements to the 21(V) system: increased separation distances up to 1 kilometer between peripherals and increased long distance data transfer rates up to 60 Mbps. (Author)

AD-A108 521/6 PC **A04**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Command and Control Related Computer Technology. Part I. Packet Radio. Part II. Speech Compression and Evaluation.
Quarterly progress rept. no. 11, 1 Jun-31 Aug 77,
M. Beeler, J. Burchfiel, A. W. F. Huggins, J. Makhoul, and R. S. Nickerson. Sep 77, 52p Rept no. BBN-3645
Contract MDA903-75-C-0180, ARPA Order-2935

This document describes progress on (1) development of a packet radio network, (2) speech compression and evaluation. Activities reported under (1) includes work on Station Software and Internetworking Research and Development; and (2) development of a new source or excitation model for the synthesizer of the narrowband LPC vocoders, with the objective of enhancing the naturalness of the synthesized speech, development and validation of several procedures for objectively evaluating the quality of LPC vocoded speech. (Author)

AD-A108 533/1 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Mission Analysis and Acquisition Div.
Increased Federal Telecommunications System Use by Strengthened Control over Commercial Toll Calls Could Reduce Costs.
22 Oct 81, 11p Rept no. GAO/MASAD-82-4
Report to the Administrator of General Services.

Commercial toll calls made by Federal employees through the Federal Telecommunications System (FTS) switchboard locations will result in an estimated $22.9 million in costs during fiscal year 1981. However, easy access to FTS makes it unnecessary to use commercial long-distance toll facilities to complete official calls. Our current review shows that the General Services Administration (GSA) needs to be more aggressive in preventing such unnecessary costs for long-distance calls. Based on nationwide data, we estimate that $10.2 million, or 44.5 percent, of the commercial toll costs will be incurred by Federal employees from FTS telephones, either intentionally or out of ignorance, when the calls could have been placed over the FTS system at nominal additional cost to the Government. This problem continues to escalate despite our previous effort to bring about corrective action.

AD-A108 604/0 PC **A06**/MF **A01**
California Univ., Berkeley.
Introduction to Spread-Spectrum Antimultipath Techniques and Their Application to Urban Digital Radio.
Research paper,
George L. Turin. Mar 80, 105p
Contract MDA903-78-C-0126, Grant NSF-ENG-21512

In a combination tutorial and research paper, techniques for combating the effects of multipath on high-rate data transmissions via radio are explored. The tutorial aspect of the paper presents: (1) a heuristic outline of twenty-five years of work on the theory of antimultipath radio receivers and (2) a summary of a statistical model of urban/suburban multipath. The research section of the paper presents results of analyses and simulations of various candidate receivers indicated by the theory, as they perform through urban/suburban multipath. A major result shows that megabps rates through urban multipath (which typically lasts up to 5 microsec) are quite feasible.

AD-A108 608/1 PC **A04**/MF **A01**
Delta Information Systems, Inc., Jenkintown, PA.
Error Processing Techniques for the Modified Read Facsimile Code.
Final rept.,
Richard A. Schaphorst. Sep 81, 52p NCS-TIB-81-9
Contract DCA100-80-C-0233

The purpose of this Technical Information Bulletin is to evaluate the relative effectiveness of four different 'error processing techniques' for the Modified READ code. The four different techniques which are investigated are listed below in order of increasing complexity of implementation: Print White (PW); Print Previous Line (PPL); Print Previous Line/White (PLW); and Normal Decode/Previous Line (NDPL). The analysis is performed by means of computer simulation. A total of 72 computer runs were performed at different combinations of CCITT test document, vertical resolution, K-factor and source of transmission errors. The performance of four candidate techniques is measured by both objective and subjective procedures. The quantitative analysis is accomplished using the Error Sensitivity Factor (ESF) which represents the average number of incorrect pels in the output document caused by a transmission error. The subjective analysis is based upon viewing actual error-contaminated images generated in the simulation process. The quantitative performance of the Print White technique was found to be significantly poorer than the other three. The ESP of the PW, under the conditions analyzed, was found to be 56.3, while the average of the other three is 46.1. The error performance of the PLW approach was found to be subjectively superior to the Print White technique and comparable to the Previous Line technique. The NDPL has superior legibility and shows promise for improved overall error performance. (Author)

AD-A108 696/6 PC **A03**/MF **A01**
Middleton (David), New York.
The Underwater Medium as a Generalized Communication Channel. Channel Characterization and Threshold Reception for Complex Underwater Acoustic Media.
Interim research rept.,
David Middleton. 1 Oct 81, 43p
Contract N00014-76-C-0543
Pub. in Underwater Acoustics and Signal Processing, p589-612 1981 and EASCON, p171-180 Oct 81.

No abstract available.

AD-A108 747/7 PC **A07**/MF **A01**
Martin Marietta Aerospace, Orlando, FL.
LOS Selective Fading and AN/FRC-170(V) Radio Hybrid Computer Simulation.
Interim rept. Feb-Sep 81 on Phase A,
M. Keith Klukis, Thomas I. Lyon, and Randall Walker. Sep 81, 131p Rept no. OR-16956
Contract DCA100-81-C-0016

This report documents results of the first phase of modeling, simulation and study of the dual diversity AN/FRC-170(V) radio and frequency selective fading line of sight channel. Both hybrid computer and circuit technologies were used to develop a fast, accurate and flexible simulation tool to investigate changes and proposed improvements to the design of the AN/FRC-170(V) radio. In addition to the simulation study, a remote hybrid computer terminal was provided to DCEC for interactive study of the modeled radio and channel. Simulated performance of the radio for Rayleigh, line of sight two ray channels, and additive noise are included in the report. (Author)

AD-A108 748/5 PC **A05**/MF **A01**
SRI International, Menlo Park, CA.
Design of a Transparent-Transponder System.
Final rept. 1 Aug 78-30 Jun 80,
D. T. Magill, A. A. Burns, and D. J. Barnes. 1 Nov 80, 88p DNA-5722F
Contract DNA001-78-C-0380

This report describes and discusses the engineering specifications of a proposed system of great flexibility and general applicability for directly determining the effects of disturbed plasmas on a wide variety of actual or proposed signal waveforms. Both rocket-borne and satellite applications and missions are possible, and numerous signals in the VHF-UHF range (to about 1.5 GHz) can be dealt with simultaneously without undue mutual interference. The system operates by retransmitting back to earth signals that originally had been modulated onto the lower sideband of an 8-GHz uplink carrier. If they passed through regions of naturally occurring or man-made plasma disturbances, the downlink signals would suffer degradations similar to those produced by the high-altitude nuclear environment. Even when the uplink transmitter is collocated with the downlink receiver (a convenient arrangement), the rather high frequency of the uplink signals ensures that plasma effects will be minimal on the uplink. The flexibility to readily change the types of downlink signals and their parameters makes this system particularly attractive for a satellite application because of the long-term nature of many satellite missions. Alternative

system configurations and design tradeoffs are considered in detail. (Author)

N81-71812/4 PC **A11**/MF **A01**
ORI, Inc., Silver Spring, MD.
Prediction of Millimeter Wave Propagation Effects on Earth-Space Paths (10-100GHz).
Technical rept. (Final),
R. Kaul, D. B. Hodge, and D. M. Theobold. Dec 78, 236p ORI/TR-1418, NASA-CR-163843
Contract NASA-23438
Portions of this document are not fully legible.

This report summarizes recent prediction techniques and results obtained by U.S. propagation researchers and system engineers. The results are written for satellite system engineers working in the 10 to 100 GHz frequency range in the US and Canada. The seven sections of this report present prediction techniques for attenuation, path diversity, signal fluctuations and low angle fading, depolarization, bandwidth coherence and sky noise. Each section may be utilized individually and example calculations have been included as a guide for the system engineer.

N82-13301/8 PC **A06**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Modulation/Demodulation Techniques for Satellite Communications. Part 1: Background.
J. K. Omura, and M. K. Simon. 15 Nov 81, 111p NASA-CR-165020, JPL-PUB-81-73
Contract NAS7-100

Basic characteristics of digital data transmission systems described include the physical communication links, the notion of bandwidth, FCC regulations, and performance measurements such as bit rates, bit error probabilities, throughputs, and delays. The error probability performance and spectral characteristics of various modulation/demodulation techniques commonly used or proposed for use in radio and satellite communication links are summarized. Forward error correction with block or convolutional codes is also discussed along with the important coding parameter, channel cutoff rate.

N82-13302/6 PC **A04**/MF **A01**
ARINC Research Corp., Annapolis, MD.
The 30/20 Ghz Communications Satellite Trunking Network Study.
W. Kolb. Oct 81, 65p NASA-CR-165467
Contract NAS3-22496

Alternative transmission media for a CONUS-wide trunking network in the years 1990 and 2000 are examined. The alternative technologies comprised fiber optic cable, conventional C- and Ku-band satellites, and 30/20 GHz satellites. Three levels of implementation were considered - a 10-city network, a 20-city network, and a 40-city network. The cities selected were the major metropolitan areas with the greatest communications demand. All intercity voice, data, and video traffic carried more than 40 miles was included in the analysis. In the optimized network, traffic transmitted less than 500 miles was found to be better served by fiber optic cable in 1990. By the year 2000, the crossover point would be down to 200 miles, assuming availability of 30/20 GHz satellites.

N82-13342/2 PC **A06**/MF **A01**
Allgemeine Elektricitaets-Gesellschaft AEG Telefunken, Backnang (Germany, F.R.).
Investigation of Modulation Methods and System Aspects for Regenerative Satellite-Repeater.
Final Report.
S. Rasmussen, W. Schreitmueller, and R. Wrzesinsky. Sep 80, 115p BMFT-FB-W-80-024, ISSN-0170-1339
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Various modulation methods are compared by means of a simulation program for carrier recovery circuits. This program incorporates Q phase shift keying with offset, real carrier and clock recovery systems, adjacent channel interference, and multipath effects. Applications are given for quadrature amplitude modulation systems envisaged for satellites, Q phase shift keying with and without offset, and coherent modulation and demodulation of frequency shift keying. Regenerative repeaters for satellite communication are shown to present many advantages and a special solution is proposed for effective control of fading on the downlink and the uplink of a satellite system. A fundamental concept of a regenerative satellite repeater is defined, allowing system variants to be chosen in function of the number and size of the ground stations.

PATENT-4 291 338 Not available NTIS
Department of the Navy, Washington, DC.
Automatic Exposure Control for Pulsed Active TV Systems.
Patent,
Larry A. Thomas. Filed 29 Apr 80, patented 22 Sep 81, 6p AD-D009 028/2, PAT-APPL-6-144 811
Supersedes PAT-APPL-6-144 811, AD-D008 026.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An automatic exposure control system is disclosed for TV cameras, particularly those of the active type wherein a pulsed light source provides scene illumination for the camera. The control system includes a major control loop wherein an instantaneous photocathode current signal is time-separated from the total sensor signal of an image tube and integrated to provide a real-time measure of the total instantaneous light input upon the photocathode of the tube. When the total light input reaches a predetermined exposure level, a pulse is generated for gating off the image tube via a high voltage supply therefor so that a constant effective exposure is provided the photocathode. Peak levels of the photoelectron current are used to vary the amount of light entering the system and a conventional video detector is included to regulate the photocathode voltage thereby permitting a relatively constant video output signal to be maintained throughout a wide range of input light conditions. (Author)

PB82-134289 PC **A04**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Electromagnetic Wave Trajectories at VHF and Higher Frequencies,
H. T. Dougherty. Oct 81, 63p NTIA-CR-81-14

The basics of conventional ray tracing are adapted for the point-to-point telecommunications problem. The formulation of Millington is extended to identify a wave trajectory, that specific trajectory launched from a source that also reaches a predetermined receiving location. The single wave trajectory of the standard or well-mixed atmosphere is described, and the multiplicity of wave trajectories in the ducting environment is defined. The resulting engineering expressions are used in numerical examples to demonstrate some interesting aspects of duct propagation. A brief discussion relates these wave trajectories to the problem of defining hybrid ray-mode solutions of the full-wave ducting problem and the need for further development of both wave trajectories and hybrid solutions.

PB82-134917 CP **T03**
Federal Communications Commission, Washington, DC. Data Automation Div.
FCC Broadcast FM Data Base.
Data file,
Charles Johnson. Nov 81, mag tape FCC/DF-81/039
Supersedes PB80-226459.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The Broadcast FM Data Base contains records for existing and proposed stations, allocations, rulemaking petitions/proposals, and translator/boosters. The data base is converted from Honeywell system standard format, BCD to EBCDIC, 1600 bpi, 9 track, odd parity tape, on the Honeywell H-6023. The data base contains approximately 10,565 records of 300 characters in length, 10 records per block.

PB82-134925 CP **T03**
Federal Communications Commission, Washington, DC. Data Automation Div.
Broadcast TV Data Base.
Data file,
Charles Johnson. 1981, mag tape FCC/DF-81/038
Supersedes PB81-104705.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The Broadcast TV Data Base contains records for existing and proposed stations, allocations, and rulemaking petitions/proposals. The data base is converted from Honeywell system standard format BCD, to EBCDIC, 1600 bpi, 9 track, odd parity tape, on the Honeywell H-6023. The data base contains approximately 9175 records of 360 characters, 1 record per block.

PB82-134933 CP **T99**
Federal Communications Commission, Washington, DC. Computer Applications Div.
Marine (Telephone) Radio Station Data Base.
Data file,
William Bushman. Nov 81, mag tape FCC/DF-81/037
Supersedes PB81-191744.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

The tape contains data for applicants and licensees operating under the Marine Radio Service, and the primary information is obtained from FCC Form 501 and 506 'Application for Ship Radio Station License' and FCC Form 502 'Application for Ship Radiotelephone and/or Radionavigation Station License.' Data records include station and license identification, mailing address (all items do not contain Zip Codes), radiofrequency, issue and expiration dates, and various codes.

PB82-139213 PC **A09**/MF **A01**
California Inst. of Tech., Pasadena.
Optical Communication Systems: Proceedings of the National Science Foundation-User Meeting on Optical Communication Systems Held at Pasadena, California on June 4, 5, 1979,
Amnon Yariv. Jun 79, 185p NSF/RA-790751
Grant NSF-AST76-80801
Prepared in cooperation with Hughes Aircraft Co., Fullerton, CA.

This proceedings consists of state-of-the-art developments in optical communication theory and devices presented at a conference in which industry, academia, and government were represented. Under atmospheric optical communication and detection, the following topics were covered: quantum nondemolition sensors for gravitational-wave detection; phase compensation system for low visibility optical communication; information transmission and processing for stochastic point processes; the Neyman Type-A distribution in photon counting, nuclear counting, and neural counting; research in quantum detection theory; and an optical space communication system. Optical communications devices, guided wave devices, and optoelectronic devices were also covered under individual sessions. Examples of topics from each of these areas are (1) short pulse phenomena and optical guiding; (2) arrays of curved and tapered optical channel waveguides; semiconductor research for guided wave optical communication; and thermal and electrical transport characterization of optical integrated circuits.

PB82-139262 PC **A04**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Signals and Interference in FM Reception: I. Deterministic Models - The 'Instantaneous' Approach, with Undistorted Inputs,
David Middleton, and A. D. Spaulding. Oct 81, 63p NTIA/REPORT-81-87

The purposes of this study (and subsequent efforts) are several: (1) to extend earlier models of the FM reception process, to include as much 'realism' - i.e., non-ideality of both the linear and nonlinear elements of the typical FM receiver - as possible, and still retain analytical and computational feasibility; (2) to examine explicit cases of interference produced by one or more deterministic signals; and (3) with such specific examples, both to provide insights into the distortion effects generated by the nonlinear interactions of the various (desired and undesired) signals in the receiver and to present the analytical framework of the instantaneous outputs required in any (subsequent) fully statistical treatment, where now the interference (e.g., 'noise') is

noticeably nongaussian. In addition, these deterministic models may also provide useful structures for simulation studies.

PB82-140237 PC **A10**/MF **A01**
Federal Communications Commission, Washington, DC. Office of Plans and Policy.
FCC Policy on Cable Ownership.
Final rept.,
Kenneth Gordon, Jonathan D. Levy, and Robert S. Preece. Nov 81, 221p

This report is the result of the Commission's directive in October 1980, that the staff study FCC cable ownership policies, particularly those dealing with cross ownership of cable systems by telephone companies, broadcasters and TV networks; multiple ownership of local cable systems, and cable system programming functions. The report provides a framework for analyzing cable ownership, applies that framework to specific areas, and advances specific recommendations and courses of action to the Commission.

PB82-140500 CP **T03**
Federal Communications Commission, Washington, DC. Data Automation Div.
Common Carrier Land Mobile Base Station Data Base.
Data file,
Bill Lannin. Dec 81, mag tape FCC/DF-81/040
Supersedes PB81-146664.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB-295 974.

The file contains data provided by common carrier in the land Mobile Base Station Industry. The data is categorized under three phases: pending, under construction, and licensed. Each applicant/communication system is described according to ownership, location data, antenna data, transmitter data, and then relationship(s). The system generates Construction Permits, Station File Jackets, Licenses, and a monthly Data Base Listing.

PB82-141292 PC **A04**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
An Integrated Communications Demand Model,
C. F. Doubleday. Nov 80, 60p CUED/F-CAMS-TR-205-1980

This report describes the outcome of the initial phase of a research project, sponsored by British Telecom, in which a computer model of communications demand is being developed. The completed model will allow dynamic simulations of the long-term evolution of demand for communications media in the U.K. to be made under alternative policy options and alternative assumptions about social, economic and technological trends in British Telecom's business environment. After an introductory part in which the context and objectives of the project and the potential uses of the model are reviewed, the report discusses four key concepts in the demand for communications media, around which the model is being structured. These comprise (1) the generation of communications demand, (2) substitution between media, (3) technological convergence, and (4) competition. Subsequently, two outline perspectives on the model itself are given.

PB82-142191 PC **A03**/MF **A01**
Federal Communications Commission, Washington, DC. Office of Science and Technology.
A Report on the Technological Aspects of Regulatory-Policy Issues of Geostationary Platforms,
Satyen Das. Dec 81, 35p FCC/OST-R81-1

The report gives a brief discussion of the NASA's ongoing study on geostationary platforms and their possible application to low cost communication services. Explored in the report is a number of regulatory technology-policy issues related to the introduction of a geostationary platform, e.g. organizational arrangements for platform operation, electromagnetic compatibility at orbital environment, sharing with terrestrial services and other satellites, diversity operation, frequency re-use, small orbit spacing and efficient modulation techniques. The report notes that some technological-policy issues may require demonstrated results before a commercially viable geostationary platform is implemented by investors and approved by regulators. The report indicates that it may be beneficial to explore further the regulatory issues so that the barriers to the introduction of a geostationary platform could be minimized if public demand develops for this advanced technology.

PB82-803198 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nonverbal Communication. 1964-December, 1981 (Citations from the NTIS Data Base).
Jan 82, 149p
Supersedes PB80-815012, and NTIS/PS-79/0969.

Various methods and usages of communicating without voice are researched in the reports cited. Major emphasis is on communication systems of the deaf or hearing impaired. Visual systems for airports, mines, highways, underwater environments, and interpersonal communications known as body language are included. Also included are reports on parapsychology, mental telepathy, and extrasensory perception. (This updated bibliography contains 158 citations, 80 of which are new entries to the previous edition.)

PB82-803396 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Single Sideband Communications. 1964-November, 1981 (Citations from the NTIS Data Base).
Jan 82, 199p
Supersedes PB80-814262, and NTIS/PS-79/0760.

The bibliography contains Federally-sponsored research on single sideband communication equipment and systems. Reports on the design, development, and operation are presented. Studies on single sideband transmission, modulation, and single processing are included. (This updated bibliography contains 191 citations, 20 of which are new entries to the previous edition.)

PB82-803404 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Single Sideband Communications. 1970-November, 1981 (Citations from the Engineering Index Data Base).
Jan 82, 257p
Supersedes PB80-814270, and NTIS/PS-79/0761.

The bibliography cites reports from worldwide research on single sideband communication equipment and systems. Reports on the design, development, and operation are presented. Studies on single sideband transmission and signals are included. (This updated bibliography contains 255 citations, 44 of which are new entries to the previous edition.)

PB82-803594 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Speech Intelligibility. 1964-1978 (Citations from the NTIS Data Base).
Jan 82, 282p

The citations contain results of studies on the intelligibility of direct oral communication between humans. The bibliography also cites research on speech transmitted via voice communication systems and equipment. Studies on factors which enhance or interfere with auditory perception of underwater speech and helium speech are included. Most of the citations deal with the English language. (This updated bibliography contains 275 citations, none of which are new entries to the previous edition.)

PB82-803602 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Speech Intelligibility. 1979-December, 1981 (Citations from the NTIS Data Base).
Jan 82, 56p
Supersedes PB80-814916, and NTIS/PS-79/0961.

The citations contain results of studies on the intelligibility of direct oral communication between humans. The bibliography also cites research on speech transmitted via voice communication systems and equipment. Studies on factors which enhance or interfere with auditory perception of underwater speech and helium speech are included. Most of the citations deal with the English language. (This updated bibliography contains 49 citations, 20 of which are new entries to the previous edition.)

PB82-862079 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Adaptive Communication. 1970-January, 1982 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 82.
Jan 82, 119p
Supersedes PB80-808520.

This bibliography cites reports relating to a variety of approaches to the problem of maintaining electronic communication, including radar operation and satellite data links, when noise, jamming, interference, or atmospheric variables tend to degrade the signal. The solutions include adaptive routing, antenna array design, matched filters, coding, phase modulation, and other techniques. (This updated bibliography contains 93 citations, 33 of which are new entries to the previous edition.)

17D. Electromagnetic and Acoustic Countermeasures

AD-A108 348/4 PC **A02**/MF **A01**
Strategic Air Command, Offutt AFB, NE. Aircraft Engineering Div.
AN/ALQ-135 Tail Warning System Follow-on Operational Test and Evaluation.
Final rept.
Vincent M. Jenkins. 23 Nov 81, 5p Rept no. SAC/LGME-P-405

This is a study of the reliability and maintainability of the tail warning system (TWS) AN/ALQ-153. This TWS is a solid state pulsed doppler radar designed to provide warning and initiate countermeasures against threats attacking from the tail of B-52G/H aircraft. (Author)

PATENT-4 299 166 Not available NTIS
Department of the Air Force, Washington, DC.
Containment and Release Device for Fluids.
Patent,
Donald J. Carignan, and William Lewis. Filed 21 Nov 79, patented 10 Nov 81, 4p AD-D009 057/1, PAT-APPL-6-096 720
Supersedes PAT-APPL-6-096 720, AD-D006 894.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A dispenser retains a hermetically sealed metal canister which holds a pyrophoric fluid, radar chaff, other electronic countermeasure materials or a combination thereof for ejection from an aircraft. Several openings in the canister are sealed with Pyrofuze foil material closures and a Pyrofuze wire braid is interconnected between each of the closures and the canister in close proximity to a Pyrofuze delay braid having one end thereof fixedly attached to the canister. A safety tab on one corner of the canister extends downward between the delay braid and the wire braid to prevent cross ignition until the canister is fully ejected from the dispenser. When a gas producing squib on the dispenser is fired, the Pyrofuze delay braid is ignited by the flame front from the squib and the canister is forced from the dispenser causing the safety tab to be automatically removed from the canister. This allows the delay braid to ignite the Pyrofuze wire braid which burns to each of the closures causing them to burn away thereby releasing and igniting the pyrophoric material from the canister. (Author)

17E. Infrared and Ultraviolet Detection

AD-A108 186/8 PC **A03**/MF **A01**
General Electric Co., Syracuse, NY. Electronics Lab.

Pulsed Heterodyne CO2 Laser/Scanner System,
G. B. Jacobs. Sep 81, 46p SCIENTIFIC-1, AFGL-TR-81-0262
Contract F19628-80-C-0184

Ten-micron heterodyne laser radar offers a new type of remote sensor that can add significantly to our characterization and understanding of the atmosphere. For example, accurate range-resolved measurements of air velocity via the Doppler of aerosol backscatter-to distances of tens of kilometers-will yield a better understanding of wind shear. This report describes the design of an operational laser radar trailer facility to permit these measurements. This is a design evaluation report intended to aid the government in judging the capability of our design to meet the government's requirements. The system is to incorporate the high pulse repetition frequency, high-power electron-beam injection CO2 laser developed earlier by the General Electric Company. The system is to be assembled in a trailer to be supplied by the government and will permit hemispherical scanning with a laser beam of less than .002 degrees beamwidth. (Author)

AD-A108 576/0 PC **A02**/MF **A01**
Boston Coll., Chestnut Hill, MA. Space Data Analysis Lab.
Background Measurements from a Balloon-Borne Staring Sensor,
R. E. Murphy, F. H. Cook, and B. K. Yap. 1981, 14p AFGL-TR-81-0322
Contract F19628-79-C-0139
Pub. in AGARD Conference Proceedings, Rept. no. AGARD-CP-300, p20-1 thru 20-11 Jul 81, AD-A106 287. Prepared in cooperation with Yap Analytics, Inc., Lexington, MA.

No abstract available.

PATENT-4 302 667 Not available NTIS
Department of the Air Force, Washington, DC.
Near Millimeter Bistable Device.
Patent,
Raymond Y. Chiao, Harold R. Fetterman, and Howard R. Schlossberg. Filed 17 Oct 79, patented 24 Nov 81, 4p AD-D009 054/8, PAT-APPL-6-085 663
Supersedes PAT-APPL-6-085 663, AD-D006 824.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A near millimeter bistable device is described having a source of electromagnetic radiation in optical alignment with a variable reflecting means in the form of a Schottky barrier diode corner cube assembly. Interposed between the radiation source and the variable reflecting means is a beam splitter which reflects a beam of energy from the variable reflecting means through another beam splitter to a detector. The voltage produced by the detector is fed through a feedback circuit back to the variable reflecting means in order to vary the reflectivity thereof. In this manner the output of the device emanating from the other beam splitter has two stable conditions, one of relatively high output power and one of relatively low output power.

17G. Navigation and Guidance

AD-A108 511/7 PC **A03**/MF **A01**
Army Missile Command, Redstone Arsenal, AL. Guidance and Control Directorate.
Software Features Applicable to Inertial Measurement Unit Self-Alignment.
Technical rept.,
H. V. White, J. C. Hung, and W. G. Cantrell. Dec 80, 36p DRSMI/RG-81-11-TR, SBI-AD-E950 182

This report documents two software features applicable to inertial measurement unit self-alignment. Features are the continuous-time algorithm and the 'scraping' technique. Fortran programs for least-square with and without scraping are included. (Author)

AD-A108 607/3 PC **A04**/MF **A01**
Nebraska Univ., Lincoln. Dept. of Electrical Engineering.
Improvements and Extensions of the Geometrical Dilution of Precision (GDOP) Concept for Selecting Navigation Measurements.
Final rept. 1 May 80-1 May 81,
William L. Brogan. Sep 81, 69p AFWAL-TR-81-1142
Contract F33615-80-C-1092

The optimal measurement selection problem is studied for the Global Positioning Satellite system (GPS). The fundamentals of the Geometrical Dilution of Precision (GDOP) concept are briefly reviewed, because GDOP is frequently used to rank the effectiveness of potential measurements. It is shown that GDOP does not always select the best measurements in the sense of minimum mean square navigation error. For this reason weighted least-squares and minimum variance (Kalman filter) methods are used to derive several improved measurement ranking schemes. Nonuniform measurement noise and a prior knowledge about the state are taken into account. Any specified weighted combination of the component error variances can be minimized. Eigenvalue-eigenvector theory is used to derive useful bounds and to provide geometrical insight. A purely algorithmic approach is also presented and applied to a number of representative GPS cases. In addition to the static (single time point) selection problem, the time-sequential selection problem is considered. It is shown that the choice giving the smallest instantaneous position error may not give the smallest time average position error because of the trade-off existing with velocity errors. A promising approach is formulated for the sensor substitution problem. That is, should be degraded (jammed) satellite channels be deleted from the measurements, and if so, when. Which backup sensors should be used instead. A suboptimal filtering approach using state vector partitioning is used to derive some preliminary answers to these questions. (Author)

AD-A108 611/5 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
Distributed Intelligence for Air Fleet Control.
Interim rept.,
Randall Steeb, Stephanie Cammarata, Frederick A. Hayes-Roth, Perry W. Thorndyke, and Robert E. Wesson. Jun 81, 59p Rept no. RAND/R-2728-ARPA
Contract MDA903-78-C-0029, ARPA Order-3640

Distributed planning and control techniques provide potential advantages over centralized porcessing in speed, cost, reliability, flexibility, and minimization of long-distance communications for a variety of tasks, including military threat assessment, command and control decisionmaking, disaster relief coordination, and civilian air traffic control. Six different architectures for distribution of control among multiple processors are presented, and the influences of different task environments on each are discussed. The work focuses primarily on the use of distributed planning and control for civilian air traffic control. One architecture, in which each aircraft is controlled by a separate processor, is described in detail in an illustrative scenario. An initial system design is presented in which cooperating 'experts' comprise a processor. These cooperating experts sense or infer aircraft intentions, generate and evaluate plans, control and monitor plan execution, and communicate with other processors. (Author)

PAT-APPL-6-315 583 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Phase Sensitive Guidance Sensor for Wire-Following Vehicles.
Patent Application,
G. R. Hansen. Filed 30 Oct 81, 15p N82-12346/4, NASA-CASE-NPO-15341-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A guidance sensor for a wire-following vehicle which is phase sensitive is described. The sensor includes an array of coils positioned to sense the vertical component of a magnetic field produced by the AC current through the guidance wire. The outputs of the coils are fed to associated flip flops. Flip flops associated with coils, through which flux passes in one direction, e.g., up, are driven to one state, e.g., true, and flip flops associated with coils through which flux passes in the opposite direction, e.g., down, are driven to a false state. The control signal to guide the vehicle to be over the wire is a function of the number of flip flops in the true state. Circuitry is included to prevent flip flops from assuming a wrong state due to noise.

PB82-138603 PC **A08**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Flight Evaluation of LORAN-C in the State of Vermont.
Final rept. Jul 79-May 81,
F. D. Mackenzie, and C. D. Lytle. Sep 81, 162p DOT-TSC-RSPA-81-10
Prepared in cooperation with National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.

The Transportation Systems Center, Langley Research Center, the Federal Aviation Administration, and the Agency of Transportation, State of Vermont conducted a program sponsored by the Research and Special Programs Administration of the Department of Transportation to evaluate LORAN-C as a supplement to existing navigation aids for general aviation aircraft, particularly in mountainous regions of the United States and where VOR coverage is limited. This report highlights results obtained in completing 215 non-precision approaches and 104 flights. The flights, initiated in the summer months, extend through four seasons and practically all weather conditions typical of northeastern U.S. operations have been experienced. Assessment of all the data available indicates that LORAN-C signals are suitable as a means of navigation during enroute, terminal and non-precision approach operations and the performance exceeds the minimum accuracy criteria specified by the FAA Advisory Circular 90-45A, 'Approval of Area Navigation Systems for Use in the U.S. National Airspace System.'

PB82-860529 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
NAVSTAR Global Positioning System. 1977-January, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1977-Jan 82.
Jan 82, 102p

This bibliography cites reports concerned with the global system of navigation satellites developed to provide immediate and accurate worldwide three-dimensional positioning by air, land, and sea vehicles equipped with appropriate receiving equipment. Developments and applications of the NAVSTAR system are examined. Although the global positioning system is primarily a military system, civilian utilization and potential are included in this bibliography. (Contains 99 citations fully indexed and includes a title list.)

SAND-80-0013 PC **A07**/MF **A01**
Sandia Labs., Albuquerque, NM.
State Estimation Using Parallel Extended Kalman Filters on Nonlinear Measurements.
T. C. Sheives. Jan 80, 130p
Contract EY-76-C-04-0789
Thesis. Submitted to Univ. of New Mexico, Albuquerque.

The extended Kalman filter applied to state estimation using nonlinear measurements has demonstrated divergence in many applications involving large initial uncertainties because of invalid linearizations performed by the filter on the nonlinear measurement functions. No quantitative results can be found as to how invalid these linearizations must be before divergence occurs. An attempt is made to fill this void by deriving the extended Kalman filter as an approximate nonlinear least squares estimator, through the minimization of a measurement squared error function. The convergence of the extended Kalman filter is then determined by examining the squared error function and verifying the usefulness of this function through Monte Carlo simulation. The results of this analysis are then used to specify parameters for the Gaussian sum approximation. Simulation results for nonlinear measurements generated by harmonic and Gauss-Markov processes demonstrate that successful state estimation occurs using the Gaussian sum approximation, through proper parameter specification obtained by the convergence analysis. This technique is then applied to estimating the errors in an inertial navigation system through the use of nonlinear radar altimeter measurements and terrain elevation data. The results of applying this technique to terrain-aided navigation demonstrate that the Gaussian sum approximation provides good terrain-aided navigation performance for large initial uncertainties. (ERA citation 05:022819)

17I. Radar Detection

AD-A108 192/6 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Electromagnetic Subsurface Measurements.
Special rept.,
Arnold M. Dean, Jr. Oct 81, 24p Rept no. CRREL-SR-81-23

In 1974, personnel at the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) began using an impulse radar system to profile accumulations of ice forms. Through field experience, the system has been modified so that it can be effectively used as a profiling system in a ground or airborne configuration, in certain high-noise environments. The system can penetrate fresh water and media with a high water content. For instance, frazil and brash ice accumulations with approximately 50% water have been profiled to a depth of 25 to 35 ft. As a result of the CRREL modifications, the system has found extensive and varied applications as a low-level remote sensing tool. Applications include profiling ice accumulations (including ice jams), river beds, sheet ice, permafrost, subsurface ice masses, river bank revetments through air-entrained water, snow covers, sea ice, icebergs, and peat bogs. Limited laboratory work has also shown that the impulse radar system may be able to detect oil and gas under sea ice. Selected applications and data are presented. Since it has been used mainly for research, the CRREL system needs further development to make it useful to operational units. Additional development of hardware and software is recommended.

AD-A108 236/1 PC **A06**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Development of a Clear Air Radar to Detect Meteorological Hazards at Airports.
Final rept. 1 Oct 78-21 Sep 81,
R. B. Chadwick, K. P. Moran, W. C. Campbell, K. B. Earnshaw, and T. R. Detman. 21 Sep 81, 113p
AFGL-TR-81-0268

To be useful in detecting meteorological hazards such as low-level wind shear near airports, a radar must be able to: (1) detect backscatter from both clear air and rain; (2) operate at short ranges and low elevation angles; and (3) measure Doppler frequencies caused by air motion. The development of a radar with these characteristics is described and the results of testing this radar at airports are presented. Special emphasis is placed on the problems of low elevation angle operation and clutter suppression. The importance of proper siting is pointed out. In addition, it is demonstrated that the radar can readily detect the turbulent wakes of large jet aircraft. (Author)

AD-A108 404/5 PC **A08**/MF **A01**
Analysis and Technology, Inc., North Stonington, CT.
Evaluation of Two AN/APS-94 Side-Looking Airborne Radar Systems in the Detection of Search and Rescue Targets.
Interim rept. Jan 78-Aug 81,
S. R. Osmer, N. C. Edwards, Jr., G. L. Hover, and T. J. Mazour. Aug 81, 163p USCG-D-64-81, CGR/DC-23/81
Contract DTCG39-80-C-80052
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Since September 1978, side-looking airborne radar (SLAR) detection data have been gathered in conjunction with four visual detection experiments conducted by the U.S.C.G. R&D Center. These are part of a series of experiments designed to improve search planning guidance contained in the National Search and Rescue Manual. HC-130 aircraft, equipped with either the Airborne Oil Surveillance System (AOSS) or SLAR/radar image processor (SLAR/RIP) configuration of the AN/APS-94C or D SLAR, conducted controlled searches for life rafts, small boats, and 41- to 95-foot Coast Guard vessels in Block Island Sound or open ocean. Through the use of a microwave tracking system and SLAR data, the positions of searchers and targets were accurately reconstructed to facilitate the verification of detections on SLAR films or video tape. These data were used to evaluate the effects of environmental and controllable parameters on SLAR detection of the various target types. Of the 12 parameters investigated, target size/composition, search altitude, swell height, wind speed, and humidity/precipitation were found to have a significant influence on SLAR detection performance. Upper-bound lateral range curves and sweep widths for SLAR search are included. Real-time performance tests for AN/APS-94D SLAR and system performance tests for new SLARs (AN/APS-131) are recommended. More environmental conditions (severe), target types, and gain/altitude combinations should be tested. Improved image processing capability and operator training are needed. Real-time, operational lateral range curves for SLAR should be developed as inputs to the computer-assisted search planning (CASP) system. (Author)

AD-A108 598/4 PC **A04**/MF **A01**
Institute for Defense Analyses, Arlington, VA. Science and Technology Div.
A Survey of the Limits on Radar Imaging.
Final rept.,
Irvin W. Kay. Oct 81, 63p IDA-P-1586, IDA/HQ-81-23521, SBI-AD-E500 447
Contract MDA903-79-C-0202

This paper explores the theoretical limits on performance of millimeter-wave radar imaging systems whose purpose is to recognize by shape and, as far as possible, to identify military targets on the ground. It concludes that, with the possible exception of synthetic aperture radar, such systems, using antennas of a practical size, cannot provide adequate resolution for imaging, as defined in the ordinary sense, tank-size targets over ranges of tactical interest. Among the items considered are target characteristics that affect image quality, the image quality needed for target recognition and identification, and the theoretical relations between optical system parameters and image properties such as depth of field and resolution. Also considered are the appropriateness of various definitions of resolution that appear in the literature, distinctions that must be made between extended targets and point targets, and the differences between coherent and incoherent illumination with respect to resolution. In addition, this paper considers the possibility of improving image quality, particularly resolution, with the aid of superresolution techniques and apodization. It also estimates the possible reduction in the number of elements in a large antenna array by the use of an optimum array thinning distribution of the elements.

AD-A108 644/6 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
A Propagation Experiment Involving Reflection and Diffraction.
Project rept.,
M. Littleton Meeks. 26 Oct 81, 25p CMT-18, ESD-TR-81-289
Contract F19628-80-C-0002, ARPA Order-3724

Measurements of propagation at a frequency of 1090 MHz over terrain that produces specular reflection and knife-edge diffraction are in good agreement with model calculations that use images to represent the effect of reflection. A hill covered with a pine forest formed the deffracting mask, and an airport area formed the reflecting surface. Agreement between measurements and model calculations required that the diffracting knife-edge be located at treetop level. Optimum propagation into the shadow region was obtained when a maximum in the reflection-lobe pattern coincided with the mask angle. (Author)

AD-A108 704/8 PC **A03**/MF **A01**
Analysis and Technology, Inc., North Stonington, CT.
Preliminary Assessment of Coast Guard Surface Vessel Radar Detection Performance.
Interim rept. Apr 80-Aug 81,
S. R. Osmer, N. C. Edwards, Jr., G. L. Hover, and T. J. Mazour. Aug 81, 29p USCG-D-63-81, CGR/DC-24/81
Contract DTCG39-80-C-80052

Surface Vessel Radar (SVR) detection data have been collected in conjunction with two visual detection experiments conducted in 1980 and 1981 by the U.S.C.G. R&D Center. These are part of a series of experiments designed to improve search planning guidance contained in the National Search and Rescue Manual. 82-foot Coast Guard cutters equipped with the Raytheon AN/SPS-64(V) radar and 41-foot utility boats equipped with the Raytheon AN/SPS-66 radar conducted detection runs with 4- and 7-man life rafts and 15- to 18-foot fiberglass boats. Targets were equipped with varying amounts of reflective materials. The AN/SPS-64(V) was found to achieve significantly longer detection ranges than the AN/SPS-66 with all target types. Metal posts with or without radar reflectors improved target detection ranges. Cumulative Detection Probability (CDP) versus range curves are presented for representative radar/target type combinations. Results are based upon very limited data; additional data will be collected during the fall of 1981. (Author)

N82-13343/0 PC **A05**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Environment Simulator for Radar Signals on the Digital Level Radarsignalmiljoesimulator Paa Digital Nivaa.
B. Karlsson. Mar 81, 100p FOA-A-30025-E4
Text in Swedish.

Environment simulation of radar signals on the HF and video level is generally done with digitally driven analog generators. For simulation on the digital level, the same analog generators may be used with analog to digital conversion of output signals. Theoretically a diversion is implied when only the digital output signal is desired. A test simulating device on the digital level is described with the aid of multiprocessing techniques and without the use of analog generators.

PAT-APPL-6-300 762 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
R.F. Primed Plasma Limiter for Radar Receiver Protector.
Patent Application,
Harry Goldie. Filed 10 Sep 81, 15p AD-D009 041/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The plasma switching stage of a radar receiver protector is simplified and improved by the utilization of a halogen gas filled quartz container and a 'keepalive' electron source. The container is configured as a capillary stem filled with low pressure chlorine gas and provides the active switching element in the signal waveguide portion of the receiver protector. An enclosed r.f. energy source in combination with the capillary stem creates a copious and steady free electron supply. The r.f. exciting field used to activate the 'keepalive' plasma is enhanced by a coaxial re-entrant cavity located on the top wall of the receiver protector waveguide. (Author)

PAT-APPL-6-314 926 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
A Pipelined Digital SAR Azimuth Correlator Using Hybrid FFT/Transversal-Filter.
Patent Application,
C. Wu, and K. Y. Liu. Filed 26 Oct 81, 41p N82-12298/7, PATENT-C ASS 314
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A pipe lined digital signal processor for producing real time high resolution synthetic aperture radar (SAR) images is described. The hybrid processor is comprised of a fast Fourier transform for correlation in the SAR response in the range direction.

PATENT-4 292 634 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Real-Time Multiple-Look Synthetic Aperture Radar Processor for Spacecraft Applications.
Patent,
C. Wu, and V. C. Tyree. Filed 15 Dec 78, patented 29 Sep 81, 13p N82-12297/9, PAT-APPL-969 761
Supersedes PAT-APPL-969 761-78, N79-14278 (17 - 05, p 0585).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A spaceborne synthetic aperture radar (SAR) having pipeline multiple-look data processing is described which makes use of excessive azimuth bandwidth in radar echo signals to produce multiple-looking images. Time multiplexed single-look image lines from an azimuth correlator go through an energy analyzer which analyzes the mean energy in each separate look to determine the radar antenna electric boresight for use in generating the correct reference functions for the production of high quality SAR images. The multiplexed single look image lines also go through a registration delay to produce multi-look images.

PATENT-4 298 942 Not available NTIS
Department of the Air Force, Washington, DC.
Nonlinear Amplitude Detector.
Patent,
Henry E. Lee. Filed 19 Dec 79, patented 3 Nov 81, 6p AD-D009 059/7, PAT-APPL-6-105 363
Supersedes PAT-APPL-6-105 363, AD-D006 968.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A nonlinear amplitude detector generates signal amplitude from the signal's inphase and quadrature components based on a Binomial series expansion. The amplitude detector significantly reduces the processing requirement from an ideal square root operation and yet provides much improved error performance over a conventionally used linear amplitude detector. In operation, the inphase and quadrature signal components are compared for relative magnitude and the smaller magnitude signal component is squared and divided by the large magnitude signal component. The quotient from this operation is multipled by a coefficient that is selected to provide desired amplitude error deviation characteristics. Signal amplitude is then determined by summing this product with the larger magnitude signal component. (Author)

17J. Seismic Detection

AD-A108 317/9 PC **A04**/MF **A01**
ENSCO, Inc., Springfield, VA. SAR Div.
VELA Network and Automatic Processing Research.
Final rept.,
Theodore J. Cohen. 1 Jun 80, 60p Rept no. SAR(01)-FR-79-01
Contract F08606-79-C-0014

This final report summarizes the material covered in each technical report and the technical memorandum prepared in FY79, and the conclusions drawn from this material. Eight major task areas were covered as follows: SRO/ASRO Evaluation Task; Signal Detection and Extraction Using Adaptive Beamforming (ABF) Techniques; Long-Period Signal Extraction Task; Extraction of Short-Period (SP) Regional Waveforms Using Polarization Filters; Event Identification Task; Data Base Transfer Task; Detection of Signal Periodicities Task; and Review of Automatic Signal Detectors Task.

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

AD-A108 547/1 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Wavelength Scaling for Reactor-Size Laser Fusion Targets.
Memorandum rept.,
J. H. Gardner, and S. E. Bodner. 10 Dec 81, 16p Rept no. NRL-MR-4623
Contract DE-AI08-79-DP

The symmetric implosion of pellet shells will require sideways thermal transport smoothing of any laser intensity nonuniformities. A scaling law shows a surprisingly strong laser wavelength dependence for this smoothing mechanism; it places a large premium on the use of longer wavelength near-infrared lasers. This smoothing requirement conflicts with the advantages of shorter laser wavelengths for controlling deleterious plasma instabilities. (Author)

AD-A108 633/9 PC **A04**/MF **A01**
Naval Research Lab., Washington, DC.
Steady State Numerical Solution of Magnetically Insulated Charge Flow in Coaxial Geometry.
Memorandum rept.,
R. J. Barker, and P. F. Ottinger. 8 Dec 81, 66p Rept no. NRL-MR-4654
Contract ES-77-A-01-6021

A vectorized, FORTRAN computer program has been written to calculate steady-state electron and ion fluxes as well as radial profiles of the magnetic and electric fields for specific practical radial diode and magnetically insulated vacuum feed line parameters. The numerical formulation is derived in part from the theoretical treatment of the topic by K.D. Bergeron. However, it differs from the treatment in several important respects, including: a correction in one of the key scaling expressions, a restructuring of the boundary conditions to allow for specific parametric solutions, and a more careful consideration of the regions near the anode and cathode surfaces and near the electron sheath boundary. In deriving these results, analytic approximations for the fields in these 'special' regions were developed. These approximate solutions permitted numerical treatment of the singularities there. Matching the approximations between the regions also provided first-order guesses for the gross steady-state operating characteristics. (Author)

N82-13850/4 PC **A08**/MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
Gas Target Neutron Generator Studies.
V. Chatoorgoon. Oct 81, 152p UTIAS-251, CN-ISSN-0082-5255

Heat deposition in a subsonic flow can cause the formation of gas density gradients which constitute useful gas targets. The variation of beam voltage, gas density, gas pressure, gas temperature, etc., within a subsonic channel were calculated as a function of the system parameters: beam voltage, beam current, channel diameter, stagnation tank temperatue and pressure. The analysis is presented as applicable to any combination of beam particle and target gas. It was found that the subsonic gas target (SGT) is stable against all small perturbations and against certain types of large perturbations. The closely-related transonic gas target (TGT) appears to be unstable to all perturbations. Comparison of hypersonic, transonic, and subsonic gas targets shows that the SGT is the most advantageous type and operates at a lower mass flow and at less severe stagnation tank conditions than the TGT or HGT. The problem of a deuterium spill into the tritium port of a straight hypersonic target was also investigated.

N82-13900/7 PC **A03**/MF **A01**
Nagoya Univ. (Japan).
Oxygen Transport and Line Emissions in a Tokamak Plasma.
T. Kato, M. Kako, T. Amano, Y. Nomura, and S. Hayakawa. Sep 81, 34p IPPJ-544

Two models which describe the behavior of impurity in tokamaks are investigated: one is the drift model and the other the diffusion model. The drift model is a simplified one in which impurity ions drift only inward, while the diffusion of impurities is taken into account in the diffusion model. The results of the two models are compared. Spectroscopic data on oxygen impurities in JIPP T-2 tokamaks are employed for comparison with the theoretical results in which metastable populations were considered to calculate the line intensities. Oxygen transport is well interpreted with the neutral influx of energy 10 to 50 eV and anomalous diffusion of magnetic 5000 (n sub max/n sub e(r)) sq cm/sec.

N82-13901/5 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Toroidal Plasma Current Sustainment by Lower Hybrid Waves in the Wt-2 Tokamak.
M. Nakamura, T. Cho, S. Kubo, T. Shimozuma, and H. Kawai. Oct 81, 16p IPPJ-545
Prepared in Cooperation with Kyoto Univ., Japan.

Injecting RF power P sub RF near the lower hybrid frequency into an Ohmic heating plasma near the end of Tokamak discharge in the WT-2, and RF driven current sustained plasma is produced and continued to exist during the rf injection period, where the toroidal current (T sub p approximately 10 kA) is generated by the lower hybrid wave only without the Ohmic power. The efficiency of RF driven current generation is high and attains to I sub/P sub RF approximately 0.9 kA/kW.

N82-13902/3 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Soft and Hard Major Disruptions in the Profile Control Experiment of the Jipp T-2 Tokamak.
K. Toi, K. Sakurai, S. Tanahashi, and S. Yasue. Sep 81, 43p IPPJ-547

The nonlinear saturation theory of tearing modes is applied to the tokamak plasmas produced by an appropriate combination of gas puffing and plasma currentrise in JIPP T-2. The calculated relative amplitude of poloidal field fluctuations has good correlation with the experimental data. The radial extent of the island widths of m/n = 2/1 and 3/2 modes which are derived in the calculation suggests that the 'soft' major disruption, where a plasma current suffers only slight change, can be triggered by either the overlapping of 2/1 island with 3/2 one or the contact of 2/1 island with a limiter. Moreover, it is consistent with the experimental data the hard major disruption, which brings about the abrupt and significant reduction of the plasma curent, results from the combined process of two above-mentioned causes of the soft major disruption.

N82-13905/6 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Feedback Plasma Control in Hybrid Poloidal Coil System.
Y. Hamada, Y. Abe, S. Kitagawa, and K. Toi. Sep 81, 25p IPPJ-542

Analysis of feedback control characteristics in the hybrid poloidal coil system (hybrid of the ohmic and the equilibrium vertical coils) is performed. It is found that, in the complex hybrid poloidal coil system, the plasma can be sufficiently well controlled using very simple equations for the calculation of feedback voltage.

ORNL/TM-6725 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Oak Ridge TNS Program: Evaluation of a Secondary Vacuum Enclosure for TNS.
C. Sardella. Nov 79, 85p
Contract W-7405-ENG-26

This report investigates the use of a secondary vacuum enclosure (SVE) to eliminate the need for high vacuum joints between torus sectors and thereby improve device maintainability. Several conceptual SVE designs have been identified and evaluated and the vacuum building was selected as the most promising. A mechanically assembled torus having high impedance seals (rather than vacuum tight seals) between sectors is described and the mechanical characteristics of the device are discussed. The size of the vacuum pump system and the pumpdown time for the vacuum building were determined. Studied also were the many aspects of the effect a vacuum environment has on tokamak systems. The potential benefits of using a SVE on a commercial reactor were investigated and stated in terms of improved plant availability. (ERA citation 05:006385)

ORNL/TM-7034 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Remarks on the Use of Deposition Probes for Analysis of Tokamak Boundary-Layer Plasmas.
H. Vernickel. Oct 79, 30p
Contract W-7405-ENG-26

The deposition of impurities and plasma ions on probes exposed in plasma devices can be used as a diagnostic method for characterizing boundary-layer plasmas. Recent tokamak experiments have shown that quantitative measurements of impurity and plasma particle profiles can be obtained from ion scattering and nuclear reaction analysis of samples exposed in the plasma edge. For such measurements to become meaningful diagnostics, they must be related to the plasma edge behavior. In the present work a simple analytic model of the boundary-layer plasma is utilized to explore the relationship between the deposition profile on such probes and the particle confinement time and ionization probability of wall-originated impurities in the boundary layer. (ERA citation 05:005140)

Group 18A—Fusion Devices (Thermonuclear)

ORNL/TM-7191 PC **A11**/MF **A01**
Oak Ridge National Lab., TN.
EBT-P Proposed Reference Design Report.
A. L. Boch. Jan 80, 245p
Contract W-7405-ENG-26

This report describes the proposed reference design for the EBT-P proof-of-principle test device. The device described is a result of broad studies by many participating organizations from industry and from Department of Energy-sponsored fusion research groups, some working together and some in competitive studies, but all with the goal of defining a device at minimum cost and with maximum probability of meeting its goals. This design work is based upon advances in experimental and theoretical understanding of EBT achieved at Oak Ridge National Laboratory. The strategy adopted permits an initial test and validation of the key scaling properties of the ELMO Bumpy Torus concept, with a degree of built-in flexibility to extend the performance parameters toward the condition for containing a fusion reactor plasma. This will lead the way, then, to determination of a later power break-even demonstration and an eventual fusion reactor that can exploit the special high power-density and steady-state properties of the EBT concept. (ERA citation 05:009508)

PB82-803701 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electron Beam Fusion. 1964-November, 1981 (Citations from the NTIS Data Base).
Jan 82, 182p
Supersedes PB80-814940, and NTIS/PS-79/0948.

The bibliography cites research reports on using electron beams to initiate fusion as an alternative to laser fusion. (This updated bibliography contains 174 citations, 23 of which are new entries to the previous edition.)

PNL-3124 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Activation of Building Air in a Tokamak Engineering Test Facility.
B. R. Leonard, Jr., and R. T. Perry. Sep 80, 27p
Contract AP07-79ID00020

The production of radionuclides by neutron reactions in the building air of a conceptual Tokamak Engineering Test Facility has been calculated. The short-lived radionuclides exp 13 N, exp 16 N and exp 41 Ar are all found to greatly exceed their maximum permissable concentration values. Longer-lived radionuclides exp 3 H, exp 14 C and exp 39 Ar are also found to be produced in significant concentrations. The present results are compared with values calculated for three other fusion devices; TFTR, INS, and FMIT. These comparisons show that the ETF can be a prolific producer of activated air. (ERA citation 06:001724)

SAND-80-1358C PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Self-Magnetically Insulated Electron Flow in Vacuum Transmission Lines.
J. P. VanDevender, J. T. Crow, B. G. Epstein, D. H. McDaniel, and C. W. Mendel, Jr. 1980, 46p CONF-800923-3
Contract AC04-76DP00789
International symposium on discharges and electrical insulations in vacuum, Eindhoven, Netherlands, 16 Sep 1980.

The properties of the electron flow in self magnetically-insulated vacuum transmission lines are investigated. Experiments and analysis of three basic types of transitions in magnetically insulated lines indicate that beam effects dominate the power transport and electron stability. Faraday cup measurements of the loss current density to the anode show the usual electron component during the rise of the voltage and also a residual loss from negative ions. This low level loss current persists over a small fraction of the total electrode area after the electrons are insulated. The characteristics of the loss are strongly affected by how the plasma is formed. (ERA citation 05:033122)

UCAR-10060-80-2 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Mirror Fusion. Quarterly Report, April-June 1980.
E. M. O'Neal. 29 Oct 80, 73p
Contract W-7405-ENG-48

The information in each Quarterly is presented in the same sequence as in the Field Work Package Proposal and Authorization System (WPAS) submissions prepared for the US Department of Energy; the main sections are Applied Plasma Physics, Confinement Systems, Development and Technology, and Mirror Fusion Test Facility (Planning and Projects). Each of these sections is introduced by an overall statement of the goals and purposes of the groups reporting in it. As appropriate within each section, statements of the goals of individual programs and projects are followed by articles containing summaries of significant recent activity and descriptive test. (ERA citation 06:015110)

UCID-18725 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Results and Analysis of the TMX Electron-Beam Injection Experiments.
P. Poulsen, and D. P. Grubb. 1 Aug 80, 46p
Contract W-7405-ENG-48

Electron beams (e-beams) were injected into the Tandem Mirror Experiment (TMX) plasma in order to investigate the effect on the ion cyclotron fluctuations of the plasma. The power level of the e-beams was comparable to that of the injected neutral beams. It was found that injection of the e-beams produced no significant effect on the ion cyclotron fluctuations, the measured plasma parameters, or the particle and power flow of the plasma. The increase in bulk electron temperature and the production of mirror-confined electrons found in previous experiments in which e-beams were injected into a mirror-confined plasma were not observed in this experiment. Analysis of the regions and frequencies of wave creation and absorption within the plasma shows that the plasma density and magnetic field profiles through the plasma strongly affect the resonances encountered by the waves. The steep axial density profiles produced by neutral-beam injection in the TMX experiment are not conducive to efficient coupling of the e-beam energy to the plasma. (ERA citation 05:037376)

UCRL-50025-80-2 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Electronics Engineering Department Quarterly Report No.2, 1980.
30 Sep 80, 27p
Contract W-7405-ENG-48

Separate abstracts were prepared for 3 of the included sections. (ERA citation 06:004393)

UCRL-82550(Rev.1) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Solid State Track Detectors in the Inertial Confinement Fusion Program at LLL.
N. M. Ceglio, and E. V. Benton. 30 Jan 80, 27p CONF-790765-4
Contract W-7405-ENG-48
10. international conference on solid state nuclear track detectors, Lyons, France, 2 Jul 1979.

Two recent conference papers on the use of cellulose nitrate and CR-39 to diagnose laser fusion targets are combined with a chronological introduction and update to efforts in this area. (ERA citation 05:019865)

UCRL-82894 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Fluid Mechanics Considerations for Liquid Wall Inertially Confined Fusion Reactors.
J. Hovingh, S. Thomson, and J. A. Blink. 15 Nov 79, 12p CONF-791102-159
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The primary fluid mechanics issue in the liquid wall ICF reactor is the response of the liquid to the volumetric deposition of very intense energy fluxes. The liquid disassembles and impacts on the structure of the reactor, resulting in high structural stresses. In addition, high speed drops are formed which cool the vaporized liquid in the cavity, and impact on the structure, causing surface erosion. This paper presents simple scaling models for estimating the bulk liquid impact stresses on the structure, as well as the droplet velocity and size distribution. (ERA citation 05:023374)

UCRL-83518(Rev.1) PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Theory of Field-Reversed Mirrors and Field-Reversed Plasma-Gun Experiments. Paper IAEA-CN-38/R-2.
D. V. Anderson, S. P. Auerbach, and H. L. Berk. 6 Jun 80, 17p CONF-800707-6(Rev.1)
Contract W-7405-ENG-48
International conference on plasma physics and controlled nuclear fusion research, Brussels, Belgium, 1 Jul 1980.

Experimental and theoretical studies of field reversal in a mirror machine are reported. Plasma-gun experiments demonstrate that reversed-field plasma layers are formed. Low energy plasma flowing behind the initially produced plasma front prevents tearing of the layer from the gun muzzle. MHD simulation shows that tearing can be obtained by impeding the slow plasma flow with a plasma divider. It is demonstrated theoretically that a field-reversed mirror imbedded in a multipole field can be sustained in steady state with neutral-beam injection even in the absence of impurities. MHD stability analysis shows that growth rates of elongated reversed-field theta-pinch configurations decrease with axial extension, which indicates the importance of including finite Larmor radius in the analysis. Tilting-mode criteria are improved by proper shaping, and a problimak shape is proposed. Tearing mode stability of reversed-field theta-pinches is greatly enhanced by flux exclusion. Self-consistent, 1-1/2-dimensional transport codes have been developed, and initial results are presented. (ERA citation 05:029954)

UCRL-84228 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Field Reversal Produced by a Plasma Gun.
C. W. Hartman, W. Condit, E. H. A. Granneman, D. Prono, and A. C. Smith, Jr. 2 Apr 80, 11p CONF-800441-1
Contract W-7405-ENG-48
International symposium on physics and open-ended fusion systems, Tsukuba, Japan, 15 Apr 1980.

Experimental results are presented of the production of Field-Reversed Plasma with a high energy coaxial plasma gun. The gun is magnetized with solenoids inside the center electrode and outside the outer electrode so that plasma emerging from the gun entrains the radial fringer field at the muzzle. The plasma flow extends field lines propagating a high electrical conductivity, the flux inside the center electrode should be preserved. However, for low flux, the trapped flux exceeds by 2 or more the initial flux, possibly because of helical deformation of the current channel extending from the center electrode. (ERA citation 05:021510)

UWFDM-375 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Commercial Tandem Mirror Reactor Design with Thermal Barriers: WITAMIR-I.
G. L. Kulcinski, G. A. Emmert, and C. W. Maynard. Oct 80, 16p CONF-801011-68
Contract AS02-78ET52048
ANS topical meeting on the technology of controlled nuclear fusion, King of Prussia, PA, USA, 14 Oct 1980.

A conceptual design of a near term commercial tandem mirror power reactor is presented. The basic configuration utilizes yin-yang minimum-B plugs with inboard thermal barriers. The maximum magnetic fields are 6.1 T, 8.1 T, and 15 T in the central cell, yin-yang, and thermal barrier magnets, respectively. The blanket utilizes Pb sub 83 Li sub 17 as the coolant and HT-9 as the structural material. This yields a high energy multiplication (1.37), a sufficient tritium breeding ratio (1.07) and has a major advantage with respect to maintenance. The plasma Q is 28 at a fusion power level of 3000 MW(t); the net electrical output is 1530 MW(e); and the overall efficiency is 39%. Cost estimates indicate that WITAMIR-I is competitive with recent tokamak power reactor designs. (ERA citation 06:005616)

UWFDM-380 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
WITAMIR-I: A Tandem Mirror Reactor with Non-Zero Nu.
J. Santarius, K. Audenaerde, and J. Beyer. Sep 80, 7p CONF-800950-16
Contract AS02-78ET52048
11. symposium on fusion technology, Oxford, UK, 15 Sep 1980.

WITAMIR-I, a teandem mirror reactor, is a study by the University of Wisconsin fusion engineering design group. Various engineering aspects and physics considerations are presented. WITAMIR-I is a high Q device with particularly attractive maintenance fea-

tures and blanket characteristics. (ERA citation 06:005617)

18B. Isotopes

MLM-2718 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Stable Isotope Sales: Mound Facility Customer and Shipment Summaries, FY 1979.
A. H. Ruwe, Jr. 24 Oct 80, 25p
Contract AC04-76DP00053

A listing is given of Mound Facility's sales of stable isotopes of noble gases, carbon, oxygen, nitrogen, chlorine, and sulfur for Fiscal Year 1979. Purchasers are listed alphabetically and are divided into domestic and foreign groups. A cross-reference index by location is included for domestic customers. Cross-reference listings by isotope purchased are included for all customers. (ERA citation 05:037773)

Zfl-Mitt-18 PC **A05**/MF **A01**
Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung.
Computer Codes for Tasks in the Fields of Isotope and Radiation Research.
K. Friedrich, and O. Gebhardt. Nov 78, 85p
In German.
U.S. Sales Only.

Concise descriptions of computer codes developed for solving problems in the fields of isotope and radiation research at the Zentralinstitut fuer Isotopen- und Strahlenforschung (Zfl) are compiled. In part two the structure of the Zfl program library MABIF is outlined and a complete list of all codes available is given. (Atomindex citation 11:500538)

18C. Nuclear Explosions

AD-A108 268/4 PC **A03**/MF **A01**
New Mexico Engineering Research Inst., Albuquerque.
Cylindrical In Situ Tests (CIST) 20 and 21: Analysis Report.
Final rept.,
J. D. Shinn, and J. Bean. Aug 81, 50p NMERI-DP/EM-34, AFWL-TR-80-152
Contract F29601-76-C-0015

The geologic in situ dynamic properties for near surface tuff and rhyolite were estimated based on measurements from CIST 21 and CIST 20, respectively. The resulting material models were expressed in terms of the AFWL Engineering Model. (Author)

AD-A108 742/8 PC **A09**/MF **A01**
Science Applications, Inc., Las Vegas, NV.
Instrumentation Support for the Huron King Underground Test.
Final rept. 13 Jun 79-30 Nov 80,
Kenneth R. Sites, and Doyle E. Woodward. 9 Dec 80, 186p SAI-81-36-LV, DNA-5548F
Contract DNA001-79-C-0389

An SGEMP experiment was fielded on the Huron King underground test (UGT) at the Nevada Test Site (NTS). The SAI Las Vegas office designed and operated a recording system that collected data from the SGEMP experiment. The recording system contained 350 wideband oscilloscopes and 11 magnetic tape recorders, plus ancillary equipment, that were mounted in six instrumentation trailers. SAI provided all engineering and technician support necessary to design and operate these trailers. SAI collected and processed all shot data as well as preshot calibration data. Special hardware was provided to support systems calibration and data recording. X-ray and gamma trigger diodes also were fielded. Their purpose was primarily to trigger the recording system oscilloscopes. A secondary purpose was to quantify the radiation level near the top interior of the experiment tank. A total of 512 measurements were made. They were recorded on scopes and tape recorders that yielded 753 data records. Measurements refer to sensors that recorded field strengths, currents, and voltages throughout the test vehicle. Additional measurements were made to verify proper performance of the EAGE, receipt of sequence commands, and general housekeeping data.

UCID-15644-80-1 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
General Chemistry Division Quarterly Report, January-March 1980.
J. E. Harrar, and M. E. Hasbrouck. 7 May 80, 28p
Contract W-7405-ENG-48

Analytical developments for the nuclear explosives programs include: the coupling of several analytical instruments, a MS inlet for on-line cryogenic separation, a cold electron-impact ion source, calibration of a light-isotope mass spectrometer, far-infrared laser development, characteristics of mode-locked krypton-ion laser, photoelectrochemical flash experiments, analysis of chemical explosives, GC-IR analysis of the perfluorocarbon FC-86, and a scintillation detector for measuring tritium. In the energy programs, a procedure was developed for determining thallium in zeolites by controlled-potential coulometry. Special projects were: use of laser-induced fluorescence with HPLC for analysis of PAHs in fly ash, removal of fluoride from geothermal water, and automation of mass spectrometer. (ERA citation 05:032634)

UCID-18529 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Some Predicted Peak Ground Motions for Nuclear Cratering Explosions Along the Qattara Alignment in Egypt.
J. B. Bryan. Jan 80, 18p
Contract W-7405-ENG-48

Some predicted peak free-field ground motions at shot depth for the nuclear explosive excavation of a canal in Egypt are summarized. Peak values of displacement, velocity, acceleration, and radial stress are presented as a function of slant range from the working point. Results from two-dimensional TENSOR cratering calculations are included. Fits to ground motion measurements in other media are also shown. This summary is intended to help specify engineering design requirements for detonating nuclear explosive salvos which are required to efficiently excavate the canal. It also should be useful in guiding estimates for gage response ranges in ground motion measurements. (ERA citation 05:016423)

18D. Nuclear Instrumentation

LA-8556-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Measurement of Highly Enriched Uranium Metal Buttons with the High-Level Neutron Coincidence Counter Operating in the Active Mode.
J. E. Foley. Oct 80, 24p ISPO-120
Contract W-7405-ENG-36

The portable High-Level Neutron Coincidence Counter is used in the active mode with the addition of AmLi neutron sources to assay the exp 235 U content of highly enriched metal pieces or buttons. It is concluded that the portable instrument is a practical instrument for assaying uranium metal buttons with masses in the range 1.5 to 4 kg. (ERA citation 06:004601)

ORNL/TM-6926 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Experimental Study of Fission Counter Design Optimization with a Simplified Analytical Model of Performance.
K. H. Valentine, J. T. De Lorenzo, W. T. Clay, V. K. Pare, and G. C. Guerrant. Dec 79, 38p
Contract W-7405-ENG-26

Trends inferred from this study of fission counter design confirm previously known relationships between design variables and counter performance. Most important is the proved existence of an optimum electrode spacing for a specific design that increases with electrode area and decreases with gamma dose rate. The PD product also has an optimum value, with low values being limited by the presence of electronic noise and high values by enhanced gamma pileup. Conventional 50- omega signal cables do not always provide the best performance, particularly for large-area counters that have high interelectrode capacitances and operate in high gamma background. Values as low as 16.7 omega yield an improvement of as much as 20%. The performance of a counter closely follows the E/P versus drift velocity characteristic of its gas mixture, and is superior for fill gases having higher electron drift velocities. The optimum filter time constant of the counting channel depends on the gamma background dose rate. At low gamma levels, when electronic noise dominates, longer filter time constants give better signal-to-noise ratios. Counters with shorter collection times more effectively suppress the gamma pileup at high dose rates, and filters with higher break-frequencies process the faster pulses more effectively. Another conclusion from this study is that the usable neutron sensitivity per gram of neutron-sensitive material is a monotonically decreasing function of electrode area. These sensitivity losses can be minimized for high-sensitivity fission counters by use of neutron-sensitive material with low intrinsic alpha activity (such as electromagnetically enriched uranium), as well as by careful specification of the major design variables. (ERA citation 05:009017)

SAND-80-0637C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Passive Neutron Dosimetry on Cruise Missile Tests.
R. I. Ewing. 1980, 5p CONF-800703-5
Contract AC04-76DP00789
Annual conference on nuclear and space radiation effects, Ithaca, NY, USA, 15 Jul 1980.

One of the components exercised during development tests of cruise missiles is the neutron generator that supplies the burst of neutrons needed to initiate a nuclear explosion. The subject of this report is a method of verifying the production of neutrons using a passive neutron activation technique that is sufficiently sensitive to detect a decay rate of a few atoms per hour. (ERA citation 05:032730)

TU-Inf-05-32-78 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Development of a Neutron Dosemeter for Personnel Dosimetry with Direct Response of Dose Equivalent in Neutron Fields of Different Energy Spectra. 2.
B. Doerschel. Dec 78, 12p
In German.
U.S. Sales Only.

The evaluation of neutron dosemeters in personnel dosimetry using dielectric track detectors is described. Etched mica foils are evaluated by means of spark counting. The efficiency is presented in dependence on etching time. For single evaluation of the etch pits due to fission fragments the dose equivalent can be calculated as a multiple of the sparks number. (Atomindex citation 11:503022)

UCID-18792 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
REM Meter for Pulsed Sources of Neutrons.
J. E. Thorngate, G. F. Hunt, and D. W. Rueppel. 13 Aug 80, 15p
Contract W-7405-ENG-48

A rem meter was constructed specifically for measuring neutrons produced by fusion experiments for which the source pulses last 10 ms or longer. The detector is a exp 6 Li glass scintillator, 25.4 mm in diameter and 3.2 mm thick, surrounded by 11.5 cm of polyethylene. This detector has a sensitivity of 8.5 x 10 exp 4 counts/mrem. The signals from this fast scintillator are shaped using a shorted delay line to produce pulses that are only 10 ns long so that dose equivalent rates up to 12 mrem/s can be measured with less than a 1% counting loss. The associated electronic circuits store detector counts only when the count rate exceeds a preset level. When the count rate returns to background, a conversion from counts to dose equivalent is made and the results are displayed. As a means of recording the number of source pulses that have occurred, a second display shows how many times the preset count rate has been exceeded. Accumulation of detector counts and readouts can also be controlled manually. The unit will display the integrated dose equivalent up to 200 mrem in 0.01 mrem steps. A pulse-height discriminator rejects gamma-ray interactions below 1 MeV, and the detector size limits the response above that energy. The instrument can be operated from an ac line or will run on rechargeable batteries for up to 12 hours. (ERA citation 06:005585)

18E. Nuclear Power Plants

AD-A108 298/1 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Economic Impact of Closing Zion Nuclear Facility.
21 Oct 81, 82p Rept no. GAO/EMD-82-3
Report by the Comptroller General of the United States.

The Zion nuclear plant's close proximity to the heavily populated Chicago area has raised questions about the safety of its continued operations. Zion's loss would reduce power supplies below levels considered adequate to maintain reliable service. Should the demand for electricity be less than now projected, the impact would be less severe; however, should plants now under construction be delayed, the impact would be more severe. Purchased power from other utilities is the most immediate way to replace Zion's power, but the existing transmission network may be a limiting factor. New non-nuclear plants can be constructed to replace Zion, but they would not be available before the 1990s. Measures to reduce electric demand also have long-term potential, although their effectiveness will depend on costs, customer acceptance, economic conditions, and regulatory and other governmental policies. GAO discusses the pros and cons of closing the Zion facility. (Author)

NUREG-0833 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Regulatory Research.
Environmental Impact Statement on the Siting of Nuclear Power Plants: Scoping Summary Report.
Dec 81, 30p

The NRC staff has completed its scoping process for the Environmental Impact Statement for the revision of its regulations on the siting of nuclear power plants. The rulemaking and environmental review have been focused to concentrate on significant issues and alternatives and to delete items from the rulemaking on which it is not appropriate to proceed at this time. A brief discussion of the major comments is included.

SAND-79-2179 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Light Water Reactor Safety Research and Development Program. Quarterly Report, January-June 1979.
M. Rios, Jr. Apr 80, 58p
Contract AC04-76DP00789

Information on PWR and BWR reactor safety is presented concerning the Technology Management Center support programs; risk methods utilization; improved component design; improved plant design; seismic program development; man-machine interaction; and unresolved safety issues. (ERA citation 05:032325)

UCID-18689 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Technical Evaluation of the Proposed Design Modifications and Technical Specification Changes on Grid Voltage Degradation (Part A) for the Pilgrim Nuclear Power Station, Unit 1.
R. L. White. 1980, 20p
Contract W-7405-ENG-48

This report documents the technical evaluation of the proposed design modifications and Technical Specification changes for protection of Class 1E equipment from grid voltage degradation for the Pilgrim Nuclear Power Station. The review criteria are based on several IEEE standards and the Code of Federal Regulations. The evaluation compares the submittals made by the licensee with the NRC staff positions and the review criteria and presents the reviewer's conclusion on the acceptability of the proposed system. (ERA citation 06:003677)

UCID-18690 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Technical Evaluation of the Proposed Design Modifications and Technical Specification Changes on Grid Voltage Degradation (Part A) for the Rancho Seco Nuclear Generating Plant.
R. L. White. Oct 80, 16p
Contract W-7405-ENG-48

The Rancho Seco Nuclear Generating Plant has two 4160-volt and two 480-volt Class 1E buses. The existing undervoltage protection design uses a single undervoltage relay on each 4160-volt Class 1E bus. If the voltage drops below 3534 volts (85% of 4160 volts), the undervoltage relay will energize a set of load-shedding relays. The load-shedding relays initiate the disconnection of the emergency 4160-volt buses from the off-site source, load shed the emergency 4160-volt buses, start the emergency diesel generators, and provide an enabling signal for the load-sequencing timing circuit. When the emergency diesel generator reaches the required voltage it is connected to the emergency buses and load-sequencing will begin automatically, if a safety injection (SI) signal exists. The licensee has proposed a design change to establish an automatic degraded voltage protection circuitry. The modification consists of incorporating the existing undervoltage protection scheme will consist of 3 undervoltage relays monitoring each 4160-volt emergency bus. The 3 undervoltage relays will be arranged in a 2-out-of-3 coincident logic with a setpoint of 3771 volts +- 38 volts (90.6% of 4160 volts) with a time delay of 12 seconds +- 1.2 seconds. (ERA citation 06:003680)

UCID-18691 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Technical Evaluation of the Proposed Design Modifications and Technical Specification Changes for the R.E. Ginna Nuclear Power Plant, Unit 1.
J. C. Selan. 1980, 21p
Contract W-7405-ENG-48

The present design uses undervoltage relays to sense the loss of offsite power. There are no Class 1E loads on the 4160-volt buses. This design consists of two relays per 480-volt Class 1E bus (two Class 1E buses per redundant load group) for the first level of undervoltage protection. An undervoltage condition (loss-of-voltage) will result in isolating the Class 1E buses from all offsite sources, initiating emergency diesel generator start and load shedding on the Class 1E buses, permitting closure of the diesel generator supply breakers, and lastly, the loads will be automatically time-sequenced onto the buses. Actuation begins with loss of voltage to 368 volts (77% of 480 volts). The existing system does not bypass the load-shedding feature once the emergency diesel generators are energizing the Class 1E buses. The licensee has proposed a design change which includes automatic degraded voltage protection. This modification consists of the addition of two time-delayed, undervoltage relays on each 480-volt Class 1E bus, to provide the second level of undervoltage protection. (ERA citation 06:003681)

UCRL-15215 PC **A06**/MF **A01**
Nuclear Services Corp., Campbell, CA.
Seismic Safety Margins Research Program. Phase 1. Project V. Structural sub-System Response: Subsystem Response Review.
J. Fogelquist, M. K. Kaul, R. Koppe, S. W. Tagart, Jr., and H. Thailer. Mar 80, 107p
Contract W-7405-ENG-48

This project is directed toward a portion of the Seismic Safety Margins Research Program which includes one link in the seismic methodology chain. The link addressed here is the structural subsystem dynamic response which consists of those components and systems whose behavior is often determined decoupled from the major structural response. Typically the mathematical model utilized for the major structural response will include only the mass effects of the subsystem and the main model is used to produce the support motion inputs for subsystem seismic qualification. The main questions addressed in this report have to do with the seismic response uncertainty of safety-related components or equipment whose seismic qualification is performed by (a) analysis, (b) tests, or (c) combinations of analysis and tests, and where the seismic input is assumed to have no uncertainty. (ERA citation 05:034902)

UCRL-82234(Rev.1) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Earthquake Engineering Programs at the Lawrence Livermore Laboratory.
F. J. Tokarz. 28 Feb 80, 16p CONF-800919-4(Rev.1)
Contract W-7405-ENG-48
World conference on earthquake engineering, Istanbul, Turkey, 8 Sep 1980.

Information is presented concerning assessments of current seismic design methods; systematic evaluation program for older operating reactors; seismic vulnerability of fuel reprocessing facilities; and advisability of seismic scram. (ERA citation 05:032285)

VTT-ENT-Pub-24 PC **A02**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Otaniemi (Finland). Ydinvoimatekniikan Lab.
Evaluation of Nuclear Power Plant Siting by Probabilistic Assessment of Environmental Impacts.
S. Vuori. 1978, 20p
Thesis.
U.S. Sales Only.

The work consists of the description of a probabilistic consequence assessment model ARANO, and the individual calculation schemes therein included. This assessment model has been applied to the risk/benefit and cost/benefit analyses of the siting of nuclear power plants. In addition, there have been made some comparisons with the alternative fossil fuelled energy production scenarios. (Atomindex citation 10:476724)

18F. Radiation Shielding and Protection

NUREG/CR-2472 PC **A06**/MF **A01**
Battelle Columbus Labs., OH.
Shipping Cask Sabotage Source Term Investigation.
Topical rept. Nov 79-Mar 81,
E. W. Schmidt, M. A. Walters, and B. D. Trott. Dec 81, 113p BMI-2089

A need existed to estimate the source term resulting from a sabotage attack on a spent nuclear fuel shipping cask. An experimental program sponsored by the US NRC and conducted at Battelle's Columbus Laboratories was designed to meet that need. In the program a precision shaped charge was fired through a subscale model cask loaded with segments of spent PWR fuel rods and the radioactive material released was analyzed. A major portion of the program was devoted to the design and fabrication of the experimental system and extensive testing of its components. This report describes the system design and component testing in detail. After the system was assembled a series of cold tests - identical to the final experiments except that depleted UO2 was used in place of spent fuel - was conducted. These tests and their results are also described.

N82-13864/5 PC **A02**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Gamma Ray Buildup Factors in Lead-Iron and Iron-Lead Shields.
H. Penkuhn. 1980, 22p EUR-7086-EN
Submitted for Publication.

Using the gamma transport code PIPE, buildup factors are evaluated in shields consisting of: iron layers of up to 40 cm thickness followed by thick lead layers; and lead layers of up to 10 cm thickness followed by thick iron layers. The source is assumed plane isotropic and four source energies were used, ranging from 0.66 MeV (caesium source) to 6 MeV. The differences between the buildup factors for exposure and equivalent dose rates are outlined. A comparison of the buildup factors in the iron-lead sequence and the lead-iron sequence shows the latter configuration to present fewer problems.

RHO-SA-75 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Model for Analyzing Decontamination Process Systems.
R. F. Boykin, and C. W. Rolland. Jun 79, 18p CONF-7906133-1
Contract EY-77-C-06-1030
14. international meeting of the Institute of Management Science, Honolulu, HI, USA, 18 Jun 1979.

Selection of equipment and the design of a new facility in light of minimizing cost and maximizing capacity, is a problem managers face many times in the operations of a manufacturing organization. This paper deals with the actual analysis of equipment facility design for a decontamination operation. Discussions on the selection method of the equipment and the development of

the facility design criteria are presented along with insight into the problems encountered in the equipment analysis for a new decontamination facility. The presentation also includes a review of the transition from the old facility into the new facility and the process used to minimize the cost and conveyance problems of the transition. (ERA citation 05:001603)

SAND-80-1675 PC **A19**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Nuclear Criticality Safety.
B. F. Estes, and M. J. Colvin. 1980, 440p CONF-800431-
Contract AC04-76DP00789
Nuclear criticality safety topical meeting, El Paso, TX, USA, 8 Apr 1980.

Twenty-nine papers are included. Six were previously abstracted; separate abstracts were prepared for the remaining 23 papers. The conference covers historical perspectives, analysis, national programs, storage and transport training, and standards. (ERA citation 06:003545)

SAND-80-8021 PC **A02**/MF **A01**
Sandia National Labs., Livermore, CA.
Safety Analysis Report for Packaging a DOT 7A Specification Container for Tritiated Liquid Wastes.
E. Alford. Aug 80, 24p
Contract AC04-76DP00789

This Safety Analysis Report for Packaging (SARP) was prepared in accordance with ERDA (DOE) Appendix 5201 for DOE/ALO review and approval of packaging of tritiated liquid wastes to be shipped from Sandia National Laboratories, Livermore, (SNLL) California. This report presents information pertinent to the construction of tritiated liquid waste shipping containers. It contains design and development considerations, explains tests and evaluations required to prove the container can withstand normal transportation conditions, and demonstrates that the Sandia container-and-radioactive-material shipment package is in compliance with DOE and Department of Transportation (DOT) safety requirements. An internal review of this SARP has been performed in compliance with the ERDA (DOE) Manual, 5201 Appendix V. (ERA citation 05:032687)

18G. Radioactive Wastes and Fission Products

ENICO-1063 PC **A03**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
Stabilizing Simulated ICPP Waste Calcine in a 10-cm Fluidized Bed.
G. S. Pomiak, A. G. Westra, and E. L. Wade. Nov 80, 38p
Contract AC07-79ID01675

Alumina, zirconia, and zirconia-sodium blend calcines simulating those produced from nuclear reprocessing waste at the Idaho Chemical Processing Plant were denitrated in a 10-cm fluidized bed at temperatures up to 720 exp 0 C. Nitrates present in the calcines were reduced from 5.23 wt% to 0.5 wt% for zirconia-sodium calcine, from 0.17 wt% to $<$ 0.1 wt% for zirconia calcine, and from 1.31 wt% to $<$ 0.3 wt% for alumina calcine. (ERA citation 06:007007)

HEDL-TME-80-74 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Acid Digestion of Organic Liquids.
J. A. Partridge, and G. P. Bosuego. Oct 80, 50p
Contract AC14-76FF02170

Laboratory studies on the destruction of liquid organic wastes by acid digestion are discussed. A variety of liquid waste types was tested, including those encountered in the nuclear industry as well as some organic liquids representative of non-nuclear industrial wastes. The liquids tested were vacuum pump oil, tri-n-butyl phosphate (TBP), normal paraffin hydrocarbon solvent (NPH), a mixture of 30 vol% TBP in NPH, carbon tetrachloride (CCl sub 4), trichloroethane, toluene, hexone (methyl isobutyl ketone), a mixture of hexone and NPH, polychlorobiphenyl (PCB), isopropanol, normal-decane, and two waste organic solutions from Hanford radioactive waste tanks. The tests demonstrated that several types of organic liquids can be destroyed by the acid digestion process. 8 figures, 19 tables. (ERA citation 06:003527)

LBL-11204 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Proceedings of Workshop on Thermomechanical-Hydrochemical Modeling for a Hardrock Waste Repository.
W. J. Schwarz. Nov 80, 141p CONF-800751-, ONWI-164
Contract W-7405-ENG-48
Workshop on thermomechanical-hydrochemical modeling for hardrock waste repository, Bereley, CA, USA, 29 Jul 1980.

Individual papers were entered into the data base. (ERA citation 06:013471)

MLM-2692 PC **A03**/MF **A01**
Mound Facility, Miamisburg, OH.
Plutonium Adsorption by Selected Inorganic Compounds.
G. L. Silver. 10 Oct 80, 44p
Contract AC04-76DP00053

Plutonium may be removed from aqueous solution by adsorption on inorganic materials. Hydroxylapatite, dibasic and tribasic calcium phosphate, calcium cyanamide, and sodium titanate are particularly noteworthy for their ability to concentrate plutonium. The extent of adsorption and pH of maximum adsorption depend upon the chemical form of the dissolved plutonium. (ERA citation 05:037719)

NUREG/CR-2139 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Aerosols Generated by Free Fall Spills of Powders and Solutions in Static Air,
S. L. Sutter, J. W. Johnson, and J. Mishima. Dec 81, 70p PNL-3786

Safety assessments and environmental impact statements for nuclear fuel cycle facilities require an estimation of potential airborne releases. Aerosols generated by accidents are being investigated to develop the source terms for these releases. The lower boundary accidental release event would be a free fall spill of powders or liquids in static air. Experiments measured the mass airborne and particle size distribution of these aerosols for various source sizes and spill heights. Two powder and liquid sources were used: TiO2 and UO2; and aqueous uranine (sodium fluorescein) and uranyl nitrate solutions. Spill height and source size were significant in releases of both powders and liquids. For the source powders used (1 micrometer UO2 and 1.7 micrometer TiO2, quantities from 25 g to 1000 g, and fall heights of 1 m and 3 m), the maximum source airborne was 0.12%. The maximum source airborne was an order of magnitude less for the liquids (with source quantities ranging from 125 to 1000 cc at the same fall heights).

NUREG/CR-2420 PC **A04**/MF **A01**
CGS, Inc., Urbana, IL.
Reference Repository Definition: Granite.
Final rept.,
K. H. Fryer, L. S. Fruth, Jr., P. A. Domenico, and F. A. Donath. Nov 81, 61p SAND-81-7166

This study examines a 'typical' granitic pluton prerequisite to the definition and characterization of a Reference Repository System in granite (RRS-GR). Sand Springs Range, Churchill County, Nevada, was selected for the study mainly on the basis of the more abundant and detailed geologic and hydrologic data that are available as a result of its selected for the study mainly on the basis of the more abundant and detailed geologic and hydrologic data that are available as a result of its selection for the Shoal Event, Vela Uniform Program of the Atomic Energy Commission. Groundwater flow within a granite repository system will be controlled largely by the fracture field within the granitic mass and will be strongly influenced by valley-fill sediments which flank that mass. Examination of the data available for this pluton suggests that a model for the RRS-GR should consider a rather uniform fracture system.

NUREG-0856 PC **A02**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Material Safety and Safeguards.
Draft Technical Position on Documentation of Models,
S. A. Silling. Dec 81, 20p

Guidance is given for the content of documentation on computer models which are used in support of a license application for high-level waste disposal.

ORNL/TM-6802 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Recovery of Plutonium from HEPA Filters by Ce(IV): Promoted Dissolution of PuO sub 2 and Recycle of the Cerium Promoter.
F. M. Scheitlin, and W. D. Bond. May 80, 58p
Contract W-7405-ENG-26

Studies carried out in this investigation included (1) electrolytic production of Ce(IV) from Ce(III), (2) leaching of refractory PuO sub 2 from HEPA filters with maintenance of Ce(IV) by anodic oxidation during leaching, and (3) evaluation of methods for contacting the HEPA solids with the leaching solution and for separating the solid residue from the leaching liquor. Anodic oxidation of Ce(III) was accomplished with an electric current efficiency of about 85% at current densities of 0.04 to 0.4 A/dm exp 2 at Pt anode. Refractory PuO sub 2 was dissolved by a 4.0 M HNO sub 3 - 0.1 M Ce(IV) solution in 1.5 h at 100 exp 0 C using stirred-contact leaching of the solids or by recirculating the leachant through a packed column of the solids. Cerium(IV) concentrations were maintained continuously by anodic oxidation throughout leaching. Dissolution times up to 10 h were required unless the HEPA media were oxidized initially in air at 300 exp 0 C to destroy carbonaceous species which consumed Ce(IV) more rapidly than it could be regenerated be anodic oxidation. Leaching solids in packed columns avoided the relatively difficult liquid-solids separation by centrifugation which was required after stirred-contact leaching; however, the solids handling difficulties remain. A flowsheet is proposed for the recovery of actinides from HEPA filters. A 4 M HNO sub 3 - 0.1 M Ce(IV) nitrate solution is used as the leachant and the Ce(III) is recycled to the leaching operation using bidentate solvent extraction. (ERA citation 05:025378)

ORNL/TM-6893 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Radioactive Waste Disposal Areas and Associated Environmental Surveillance Data at Oak Ridge National Laboratory.
T. W. Oakes, and K. E. Shank. Dec 79, 34p
Contract W-7405-ENG-26

Environmental surveillance data have been collected around radioactive waste disposal areas for the past thirty years at Oak Ridge National Laboratory (ORNL). The wealth of data collected around the ORNL radioactive waste burial grounds is presented in this review. The purpose of this paper is to describe the solid waste burial grounds in detail along with the environmental monitoring data. The various monitoring systems are reviewed, and the liquid discharge trends are discussed. Monitoring at White Oak Dam, the last liquid control point for the Laboratory, was started in the late 1940's and is continuing. Presently, a network of five environmental monitoring stations is in operation to monitor the radionuclide content of surface waters in the White Oak Creek watershed. Facts observed during the lifetime of the disposal sites include: (1) a large amount of exp 106 Ru released during 1959 to 1964 due to the fact that Conasauga shale did not retain this element as well as it retained other radionuclides. (2) Large quantities of tritiated water have been released to the Clinch River in recent years, but, from a practical standpoint, little can be done to inhibit or control these releases. (3) A general downward trend in the number of curies released has been observed for all other radionuclides. A number of corrective measures that have been initiated at ORNL to reduce the radioactive liquid discharges are outlined in the paper. (ERA citation 05:007630)

ORNL/TM-7501 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Effects of Slag Composition and Process Variables on Decontamination of Metallic Wastes by Melt Refining.
B. Heshmatpour, and G. L. Copeland. Jan 81, 35p
Contract W-7405-ENG-26

Melt refining has been suggested as an alternative for decontamination and volume reduction of low-level-contaminated metallic wastes. Knowledge of metallur-

gical and thermochemical aspects of the process is essential for effective treatment of various metals. Variables such as slag type and composition, melting technique, and refractory materials need to be identified for each metal or alloy. Samples of contaminated metals were melted with fluxes by resistance furnace or induction heating. The resulting ingots as well as the slags were analyzed for their nuclide contents, and the corresponding partition ratios were calculated. Compatibility of slags and refractories was also investigated, and proper refractory materials were identified. Resistance furnace melting appeared to be a better melting technique for nonferrous scrap, while induction melting was more suitable for ferrous metals. In general uranium contents of the metals, except for aluminum, could be reduced to as low as 0.01 to 0.1 ppM by melt refining. Aluminum could be decontaminated to about 1 to 2 ppM U when certain fluoride slags were used. The extent of decontamination was not very sensitive to slag type and composition. However, borosilicate and basic oxidizing slags were more effective on ferrous metals and Cu; NaNO sub 3 -NaCl-NaOH type fluxes were desirable for Zn, Pb, and Sn; and fluoride type slags were effective for decontamination of Al. Recrystallized alumina proved to be the most compatible refractory for melt refining both ferrous and nonferrous metals, while graphite was suitable for nonferrous metal processing. In conclusion, melt refining is an effective technique for volume reduction ad decontamination of contaminated metal scrap when proper slags, melting technique, and refractories are used. (ERA citation 06:008656)

PAT-APPL-6-315 586 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Method and System for Nuclear Waste Disposal.
Patent Application,
T. G. Wang. Filed 30 Oct 81, 9p N82-12916/4, NASA-CASE-NPO-15454-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method and system for disposing of nuclear waste are described which comprised the encasement of small quantities of waste in spheroids containing lead. The spheroids may be formed of different materials preferably of high compressibility strength, including glass and stainless steel. The spheroids may be formed of any of these materials and coated with or lined by lead.

PNL-3387 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Design and Performance of a 100-Kg/H, Direct Calcine-Fed Electric-Melter System for Nuclear-Waste Vitrification.
R. D. Dierks. Nov 80, 70p
Contract AC06-76RL01830

This report describes the physical characteristics of a ceramic-lined, joule-heated glass melter that is directly connected to the discharge of a spray calciner and is currently being used to study the vitrification of simulated nuclear-waste slurries. Melter performance characteristics and subsequent design improvements are described. The melter contains 0.24 m exp 3 of glass with a glass surface area of 0.76 m exp 2 , and is heated by the flow of an alternating current (ranging from 600 to 1200 amps) between two Inconel-690 slab-type electrodes immersed in the glass at either end of the melter tank. The melter was maintained at operating temperature (900 to 1260 exp 0 C) for 15 months, and produced 62,000 kg of glass. The maximum sustained operating period was 122 h, during which glass was produced at the rate of 70 kg/h. (ERA citation 06:003531)

PNL-3477 PC **A10**/MF **A01**
Johnson (E.R.) Associates, Inc., Reston, VA.
Preliminary Evaluation of Alternative Waste Form Solidification Processes. Volume II. Evaluation of the Processes.
Aug 80, 222p
Contract AC06-76RL01830

This Volume II presents engineering feasibility evaluations of the eleven processes for solidification of nuclear high-level liquid wastes (HHLW) described in Volume I of this report. Each evaluation was based in a systematic assessment of the process in respect to six principal evaluation criteria: complexity of process; state of development; safety; process requirements; development work required; and facility requirements. The principal criteria were further subdivided into a total of 22 subcriteria, each of which was assigned a weight. Each process was then assigned a figure of merit, on a scale of 1 to 10, for each of the subcriteria. A total rating was obtained for each process by summing the products of the subcriteria ratings and the subcriteria weights. The evaluations were based on the process descriptions presented in Volume I of this report, supplemented by information obtained from the literature, including publications by the originators of the various processes. Waste form properties were, in general, not evaluated. This document describes the approach which was taken, the developent and application of the rating criteria and subcriteria, and the evaluation results. A series of appendices set forth summary descriptions of the processes and the ratings, together with the complete numerical ratings assigned; two appendices present further technical details on the rating process. (ERA citation 06:000286)

PNL-3540 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Comparison of Potential Radiological Consequences from a Spent-Fuel Repository and Natural Uranium Deposits.
O. J. Wick, and M. O. Cloninger. Sep 80, 97p
Contract AC06-76RL01830

A general criterion has been suggested for deep geological repositories containing spent fuel - the repositories should impose no greater radiological risk than due to naturally occurring uranium deposits. The following analysis investigates the rationale of that suggestion and determines whether current expectations of spent-fuel repository performance are consistent with such a criterion. In this study, reference spent-fuel repositories were compared to natural uranium-ore deposits. Comparisons were based on intrinsic characteristics, such as radionuclide inventory, depth, proximity to aquifers, and regional distribution, and actual and potential radiological consequences that are now occurring from some ore deposits and that may eventually occur from repositories and other ore deposits. The comparison results show that the repositories are quite comparable to the natural ore deposits and, in some cases, present less radiological hazard than their natural counterparts. On the basis of the first comparison, placing spent fuel in a deep geologic repository apparently reduces the hazard from natural radioactive materials occurring in the earth's crust by locating the waste in impermeable strata without access to oxidizing conditions. On the basis of the second comparison, a repository constructed within reasonable constraints presents no greater hazard than a large ore deposit. It is recommended that if the naturally radioactive environment is to be used as a basis for a criterion regarding repositories, then this criterion should be carefully constructed. The criterion should be based on the radiological quality of the waters in the immediate region of a specific repository, and it should be in terms of an acceptable potential increase in the radiological content of those waters due to the existence of the repository. (ERA citation 06:015361)

RFP-2952 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Chemistry Research and Development. Progress Report, November 1978-April 1979.
F. J. Miner. 5 Oct 79, 35p
Contract EY-76-C-04-3533

The status of the following studies is given: calorimetry and thermodynamics of nuclear materials; americium recovery and purification; optimization of the cation exchange process for recovering americium and plutonium from molten net extraction residues; evaluation and comparison of bidentate extractants and methods for actinide recovery; a combined anion exchange-bidontate organophosphorus extraction process for molten salt extraction residues; a combined anion exchange-extraction chromatography technique for secondary recovery; plutonium recovery in the Advanced Size Reduction Facility; decontamination of Rocky Flats soil; separating lead and calcium from americium by chromate and oxalate precipitation; demonstration of the pyroredox process in the induction-heated, tilt-pour furnace; process development for recovery of americium from vacuum melt furnace crucibles; plutonium peroxide precipitation process; and a comparative study of annular and Raschig ring-filled tanks. (ERA citation 05:002611)

RHO-BWI-80-100-2Q PC **A05**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Basalt Waste Isolation Project. Quarterly Report, January 1-March 31, 1980.
R. A. Deju. Apr 80, 94p
Contract AC06-77RL01030

This report addresses the technical progress for the Basalt Waste Isolation Project for the second quarter of fiscal year 1980. Seismic design values were developed for preliminary repository design purposes; 0.25 g horizontal and 0.125 g vertical maximum accelerations for surface, zero-period conditions. Preliminary seismic data indicate broad, smooth areas exist in the bedrock surface in the western portion of the Cold Creek syncline and a gently undulating bedrock surface in the eastern portion. Test results indicate hydraulic property values fall within the range previously reported for sedimentary and interflow zones in basalt formations at the Hanford Site. Preliminary results of available hydrochemical data obtained from several borehole sites indicate that little, if any, vertical mixing of groundwaters is taking place across this stratigraphic boundary. Multiple barrier studies indicate that the primary candidate canister/overpack alloys are TiCode-12, Inconel 625, Incoloy 825, and Zircaloy 2. Low-carbon steel and cast iron are among the list of secondary candidate canister alloys. Laboratory tests of borehole plug designs have shown that it is feasible to design a composite plug system that will satisfactorily seal a nuclear waste repository in Columbia River basalt. The National Lead Industries, Inc., NLI-1/2 Universal Spent Fuel Shipping Cask was selected for use in Phase II operations. Creep test results of samples of Umtanum basalt from borehole DC-6 were plotted and show the day-to-day variation in deformation versus time. The concept selection phase of repository conceptual design was completed in March 1980. A test plan for the Exploratory Shaft Test Facility was developed and is scheduled for submittal to the US Department of Energy in May 1980. (ERA citation 05:031698)

RHO-SA-174 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Transmutation of Radwaste Using Accelerators.
L. E. Bruns. Jun 80, 18p CONF-800743-9
Contract AC06-77RL01030
International conference on nuclear waste transmutation, Austin, TX, USA, 22 Jul 1980.

A concept was proposed by Rockwell Hanford Operations, a prime contractor for the Department of Energy (DOE), to deactivate specified nuclear wastes. Work to date was first reviewed which included literature and meetings. Criteria for feasibility were established. Accelerator concepts to meet the criteria centered on the spallation accelerator with added moderation and boost mode. Optimum target was envisioned to be a combination actinide blanket with center fission product core. A figure plotting fraction transmuted vs. time in days showed what fluxes and cross-sections were necessary to achieve practicality. Problems that need to be faced were discussed. The Rockwell proposal was reviewed followed by conclusions and future work proposed. (ERA citation 05:033321)

SAND-79-1110 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Radionuclide Sorption and Migration Studies of Getters for Backfill Barriers.
E. J. Nowak. Jul 80, 57p
Contract AC04-76DP00789

Bentonite and hectorite clay minerals were chosen for study and development as potential backfill materials for testing in the proposed Waste Isolation Pilot Plant (WIPP), a radioactive waste repository and test facility in bedded salt. This choice of materials was based on initial screening results which are presented and on the predicted physical properties of these materials. These properties were verified experimentally in concentrated brines specific to the WIPP site. Distribution coefficients, K/sub d/, were calculated from batch sorption measurements on bentonite and hectorite in the nearly saturated brines A and B. The resulting K/sub d/ values were in the range of (1 to 5) x 10 exp 3 ml/g for europium; (2 to 40) x 10 exp 3 ml/g for plutonium(IV); and (4 to 16) x 10 exp 3 ml/g for americium(III). A silica- and calcite-containing sand mixed with bentonite and hectorite acted as a sorber of americium(III) but was merely an inert diluent for plutonium(IV). Pertechnetate anions (TcO sub 4-)

sorbed on activated charcoal with K/sub d/ values in the range of (0.2 to 0.4) x 10 exp 3 ml/g. Pertechnetate, cesium, and strontium ions in brine were not sorbed appreciably by bentonite or hectorite. Although experimental evidence is given for a possible role of solubility in the sorption of europium on getters, other data presented here and evidence from the literature are inconsistent with a simple single reaction sorption mechanism. It is concluded that a backfill containing bentonite on hectorite and activated charcoal is potentially an effective barrier to the migration of Eu(III), Pu(IV), and Am(III) cations and, with further development, to the migration of TcO sub 4- anions as well. (ERA citation 05:033332)

SAND-79-1156 PC **A10**/MF **A01**
Sandia Labs., Albuquerque, NM.
Proceedings of the Fourth Annual Seabed Working Group Meeting, Albuquerque, New Mexico USA, March 5-7, 1979.
D. R. Anderson. Aug 79, 223p
Contract EY-76-C-04-0789

Objectives of the meeting were: (1) to review the technical status and policies of national programs regarding assessment of deep ocean bed disposal of high-level radioactive wastes; (2) to provide a forum for discussions, information exchange, and planning of future efforts; (3) to identify and coordinate research vessel cruises and experiments, and establish cooperative programs, and (4) to identify one-of-a-kind test facilities and consider multinational use of such facilities. Seven countries (Canada, France, Japan, Federal Republic of Germany, the Netherlands, the United Kingdom, and the United States) participated. A representative of the Commission of European Communities, Ispra Establishment, was also present. Papers submitted at the meeting, together with the reports of the Seabed Working Group Executive Committee and the individual task groups, are compiled in this document. (ERA citation 05:008173)

SAND-79-2117 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Biological Ramifications of the Subseabed Disposal of High-Level Nuclear Waste.
L. S. Gomez, R. R. Hessler, D. W. Jackson, M. G. Marietta, and K. L. Smith, Jr. May 80, 31p
Contract AC04-76DP00789

The primary goal of the US Subseabed Disposal Program (SDP) is to assess the technical and environmental feasibility of disposing of high-level nuclear waste in deep-sea sediments. The subseabed biology program is charged with assessing possible ecosystem effects of radionuclides as well as possible health effects to man from radionuclides which may be released in the deep sea and transported to the ocean surface. Current biological investigations are attempting to determine benthic community structure; benthic community metabolism; the biology of deep-sea mobile scavengers; the faunal composition of midwater nekton; rates of microbial processes; and the radiation sensitivity of deep-sea organisms. Existing models of the dispersal of radionuclides in the deep sea have not considered many of the possible biological mechanisms which may influence the movement of radionuclides. Therefore, a multi-compartment foodweb model is being developed which considers both biological and physical influences on radionuclide transport. This model will allow parametric studies to be made of the impact on the ocean environment and on man of potential releases of radionuclides. (ERA citation 05:031701)

SAND-79-7050 PC **A05**/MF **A01**
Los Alamos Technical Associates, Inc., NM.
Salt Block I Test: Experimental Details and Comparison with Theory. Final Report.
T. A. Duffey. Feb 80, 85p
Contract EY-76-C-04-0789

A series of laboratory experiments has been completed at Sandia Laboratories to provide an understanding of the steady state and transient thermal response of a large salt block containing an internal heat source. In this report, details of the experimental program are presented along with results of related efforts, such as thermal conductivity experiments, done in support of the heater experiments (Salt Block I). Finite element temperature field predictions, both transient and steady state, are performed utilizing the COYOTE nonlinear heat conduction program. Comparisons of experimental and theoretical results are generally quite good. (ERA citation 05:014983)

SAND-80-0149 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Comparison of Thermomechanical Calculations for Highly Non-Linear Quasistatic Drift Deformations.
J. R. Wayland, and L. D. Bertholf. Jul 80, 64p
Contract AC04-76DP00789

Results of code calculations for the November 14, 1979, Waste Isolation Pilot Plant (WIPP) Code Benchmark Workshop are compared. The results from five different codes (COUPLEFLO, JAC, SANCHO, SPECTROM, and STEALTH) are given for a problem involving the creep closure of an underground drift. The basic features of the codes are summarized and the codes are evaluated in terms of their applicability to WIPP problems. The codes predicted essentially the same response for this problem, and they appear to be nearly equally applicable to problems of this type. Also, a new benchmark problem is suggested along with a more realistic creep model for bedded salt. (ERA citation 05:031702)

SAND-80-0440 PC **A07**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Systems Engineering Programs for Geologic Nuclear Waste Disposal.
R. D. Klett, E. S. Hertel, Jr., and M. A. Ellis. Jun 80, 136p
Contract AC04-76DP00789

The design sequence and system programs presented begin with general approximate solutions that permit inexpensive analysis of a multitude of possible wastes, disposal media, and disposal process properties and configurations. It then continues through progressively more precise solutions as parts of the design become fixed, and ends with repository and waste form optimization studies. The programs cover both solid and gaseous waste forms. The analytical development, a program listing, a users guide, and examples are presented for each program. Sensitivity studies showing the effects of disposal media and waste form thermophysical properties and repository layouts are presented as examples. (ERA citation 05:031704)

SAND-80-0646 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Water Property Lookup Table (SANWAT) for Use with the Two-Phase Computational Code SHAFT.
M. P. Sherman, and R. R. Eaton. Oct 80, 20p
Contract AC04-76DP00789

A lookup table for water thermodynamic and transport properties (SANWAT) has been constructed for use with the two-phase computational code, SHAFT. The table, which uses density and specific internal energy as independent variables, covers the liquid, two-phase, and vapor regions. The liquid properties of water are contained in a separate subtable in order to obtain high accuracy for this nearly incompressible region that is frequently encountered in studies of the characteristics of nuclear-waste repositories. (ERA citation 06:003537)

SAND-80-0754 PC **A11**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Proceedings of the Fifth Annual NEA-Seabed Working Group Meeting.
D. R. Anderson. Sep 80, 250p CONF-8003113-
Contract AC04-76DP00789
Annual NEA-seabed working group meeting, Bristol, UK, 3 Mar 1980.

European Communities, the Federal Republic of Germany, France, Japan, Netherlands, Switzerland, the United Kingdom, and the United States on national policies and positions on seabed disposal are summarized. Task group reports on systems analysis, site assessment, canisters, waste forms, sediment and rocks, physical oceanography, and biology are presented. (ERA citation 06:003538)

SAND-80-2096C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Environmental Studies Data Base: Development and Data Synthesis Activities of the US Subseabed Disposal Program.
L. S. Gomez, R. R. Hesssler, D. W. Jackson, M. G. Marietta, and K. L. Smith, Jr. 1980, 25p CONF-801063-3, IAEA-SM-248/142
Contract AC04-76DP00789
International symposium on the impacts of radionuclide releases into the marine environment, Vienna, Austria, 6 Oct 1980.

The US Subseabed Disposal Program is assessing the scientific feasibility of subseabed emplacement of high-level nuclear wastes. Studies of disposal methods and of the barriers to radionuclide migration (canister, waste form and sediment) suggest that environmental information will be needed to address the impact of accidental release of radionuclides in the deep sea. Biological, physical, and geochemical data are being collected from field and laboratory studies as well as from literature searches. These data are being analyzed using a multicompartmental radionuclide transport model and appropriate physical oceanographic models. The data integrated into this framework will help answer two questions: what are the environmental effects of radionuclides which may be released in the deep sea, and what are the effects of such a release upon man. (ERA citation 06:000310)

SAND-80-7107 PC **E02**/MF **A01**
TRC Environmental Consultants, Inc., Wethersfield, CT.
Meteorological and Air Quality Data Quarterly Report. WIPP Site: Eddy County, New Mexico. Summer Quarter, June 1977-August 1977.
L. P. Pocalujka, E. Babij, P. A. Catizone, and H. W. Church. Jun 80, 26p
Contract AC04-76DP00789

The purpose of the WIPP meteorological, air quality, and radiological measurements program was to support the environmental effort for the evaluation of the site suitability. This data report is the latest in a series of seasonal quarterly data summaries to be issued for the southeastern New Mexico site. (ERA citation 05:033339)

STUDSVIK/K1/3-79/11 PC **A02**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Survey of the Arrangements for Waste Management at Studsvik, Sweden.
A. Lindskog. Mar 79, 22p
In Swedish.
U.S. Sales Only.

A survey of the arrangements at Studsvik, Sweden, for waste management is given. It summarizes the conditions, which are valid, and the principles which have been applied when designing the system. The different units in the total equipment are described together with their functions. (Atomindex citation 10:492235)

UCRL-82228(Rev.1) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Modeling of Brine Migration in Halite.
H. Cheung, M. E. Fuller, and E. S. Gaffney. 19 Oct 79, 10p CONF-791112-53
Contract W-7405-ENG-48
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

When canisters containing radwastes are emplaced in a repository the heat produced by the decaying radwaste will cause moderate thermal gradients to develop which will cause the brine present in a halite medium (salt deposits) to accumulate around the canister. Four different models of the migration process have been reviewed to determine their suitability as a working model. One model predicts that inclusions smaller than 0.1 mm dimension probably will not migrate. The other models do not consider size as a factor. Thermal diffusion (Soret effect) is considered insignificant in three models, while in the fourth model it is added to the concentration diffusion term. The following conclusions can be made: Temperature is the most significant parameter in all models and must be known as a function of time, and distance from the canister. All four models predict about the same migration velocity for it is a given set of conditions; for 100 exp 0 C and 1 exp 0 C/cm thermal gradient, it is 3.0, 4.8, 5.6 and 6.4 mm/y. Diffusion of ions through the brine inclusions is the rate controlling mechanism. The difference between the thermal gradients in the liquid and in the solid should always be considered and is a function of droplet shape. The model based upon work by Nernst is easiest to use, but it predicts the lowest migration rate. The maximum volume of pure brine accumulated at the canister surface would be less than 20-40 liters in 50 years, for a canister initial thermal power of 3.5 kW.Bitterns would migrate proportionately less volume. A computer code, BRINE, was developed to make these calculations by means of any of the four models. (ERA citation 05:017449)

UJV-4321-Ch PC **A02**/MF **A01**
Ustav Jaderneho Vyzkumu, Rez (Czechoslovakia).
Study of Phosphate Systems Intended for High-Level Waste Fixation. Fission Products, Fe sub 2 O sub 3 , P sub 2 O sub 5 System.
O. Vojtech, M. Santarova, J. Stejskal, and J. Suessmiich. Jan 78, 22p
In Czech.
U.S. Sales Only.

The system fission products - Fe sub 2 O sub 3 - P sub 2 O sub 5 was investigated, regarding its use for high level radioactive wastes solidification. X-ray diffraction analysis and electron microanalysis results were correlated with the values of solubility and leachability of certain important elements from the fixation products. In the system studied, three main areas were found with regard to their macrostructure: two of crystalline nature, one amorphous (glassy state). The anomalous behavior of products in the region of low P concentration was explained, using results gained by detailed microprobe analysis. The information so far obtained is of great importance for the further study of the technological process. (Atomindex citation 10:450209)

UJV-4620-D,CH,E PC **A04**/MF **A01**
Ustav Jaderneho Vyzkumu, Rez (Czechoslovakia).
Processing of Spent Nuclear Fuel from Light Water Reactors.
V. Sraier. Nov 78, 53p
In Czech.
U.S. Sales Only.

A comprehensive review is given of the reprocessing of spent nuclear fuel from LWR's (covering references up to No. 18 (1977) of INIS inclusively). Particular attention is devoted to waste processing, safety, and reprocessing plants. In the addendum, the present status is shown on the example of KEWA, the projected large German fuel reprocessing plant. (Atomindex citation 10:484129)

18H. Radioactivity

EGG-1183-1761 PC **A02**/MF **A01**
EG and G, Inc., San Ramon, CA. Energy Measurements Group.
Aerial Radiological Survey of the Rancho Seco Nuclear Generating Station, Clay Station, California, 18 January 1980 to 1 February 1980.
Nov 80, 12p
Contract AC08-76NV01183

An airborne radiological survey of 260 km exp 2 area centered over the Rancho Seco Nuclear Generating Station was made 18 January through 1 February 1980. Detected radioisotopes and their associated gamma ray exposure rates were consistent with that expected from normal background emitters, except directly over the station. Count rates observed at 90 m altitude were converted to exposure rates at 1 m above the ground and are presented in the form of an isopleth map. (ERA citation 06:006467)

NUREG/CR-2457 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Radon Diffusion Through Uranium Mill Tailings and Cover Defects,
D. W. Mayer, and D. A. Zimmerman. Dec 81, 33p
PNL-4063

Research was conducted at Pacific Northwest Laboratory to define the effects of cover defects on the emission of radon gas from covered uranium mill tailings piles. This report describes the results from the analysis of four geometrically simplified cover defects.

ORNL/TM-7386 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Sampling of Technetium-99 in Vegetation and Soils in the Vicinity of Operating Gaseous Facilities. Environmental Sciences Division Publication No. 1550.
F. O. Hoffman, J. W. Huckabee, D. M. Lucas, C. T. Garten, Jr., and T. G. Scott. Oct 80, 60p
Contract W-7405-ENG-26

Technetium-99 was measured in vegetation and soils collected near three operating gaseous diffusion facilities to obtain estimates of the soil-to-vegetation concentration factor. Analyses were performed primarily using radiochemical separations and low-level beta counting techniques with selected samples checked by isotope dilution mass spectroscopy. The concentration factor pooled from all three facilities appeared to be lognormally distributed with a geometric mean of 9.5 and a geometric standard deviation of 2.4. These values are comparable to calculated equilibrium concentration factors derived from other field experiments in which concentrations in soil and vegetation were observed to decrease with time subsequent to a single application of/sup 95m/TcO sub 4- . These field values are one to two orders of magnitude less than concentration factors derived from laboratory experiments using potted plants. It is suggested that the radiologic significance of exp 99 Tc in terrestrial food chains of importance to humans may be substantially lower than indicated by the simple difference between laboratory and field concentration factors if the time dependence of technetium activity in vegetation and soil is taken into consideration in radiological assessment models. (ERA citation 05:038713)

SAND-80-0366(Rev.) PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Observations on the Use of the Consequence Model CRAC for Small Nonreactor Atmospheric Releases.
D. M. Ericson, Jr. May 80, 28p
Contract AC04-76DP00789

The consequence model CRAC from the Reactor Safety Study was recently applied to atmospheric releases of radioactive material from nonreactor sources. This study examines the effect of three model parameters, interval size, population distribution and plume thermal bouyancy, on the consequence estimates. Recommendations for the appropriate use of CRAC in such consequence studies are included. (ERA citation 05:027702)

SSI-1-1979 PC **A02**/MF **A01**
Statens Straalskyddsinstitut, Stockholm (Sweden).
Airborne Radioactivity in Sweden.
8p
In Swedish.
U.S. Sales Only.

Samples of the airborne radioactivity are regularly taken in three places in Sweden. 18 isotopes are studies. The results of mesurements on the weekly samples are published four times a year. (Atomindex citation 11:510558)

SSI-3-1978 PC **A02**/MF **A01**
Statens Straalskyddsinstitut, Stockholm (Sweden).
Airborne Radioactivity in Sweden.
R. Arntsing, S. Jakobsson, G. Persson, and I. Vintersved. 8p
In Swedish.
U.S. Sales Only.

Samples of the airborne radioactivity are regularly taken in three places in Sweden. 18 isotopes are studies. The results of mesurements on the weekly samples are published four times a year. (Atomindex citation 11:510550)

SSI-4-1978 PC **A02**/MF **A01**
Statens Straalskyddsinstitut, Stockholm (Sweden).
Airborne Radioactivity in Sweden.
8p
In Swedish.
U.S. Sales Only.

Samples of the airborne radioactivity are regularly taken in three places in Sweden. 18 isotopes are studies. The results of mesurements on the weekly samples are published four times a year. (Atomindex citation 11:510557)

18I. Reactor Engineering and Operation

GA-A-14057(Rev.1) PC **A12**/MF **A01**
General Atomic Co., San Diego, CA.
TSPEC: A Computer Program to Predict Approximate Model Performance in the Core Flow Test Loop.
H. C. Hopkins, Jr. Jul 80, 257p
Contract AT03-76SF71023

The computer program TSPEC was developed to provide a relatively simple, approximate analysis for predicting the performance of Gas-Cooled Fast Breeder Reactor (GCFR) model core assemblies in the Core Flow Test Loop (CFTL). The test specifications will list the steady-state and transient input parameters, including the time functions of power and flow for each test run; TSPEC will predict the resultant test parameters. The structure of the code is explained and the following user information is provided: input instructions, sample calculations, a code listing, and an index of code variables. (ERA citation 06:000764)

GA-A-15420(V.1) PC **A05**/MF **A01**
General Atomic Co., San Diego, CA.
Reliability Studies for the Gas-Cooled Fast Breeder Reactor Residual Heat Removal Systems. Volume I. Summary of Probabilistic Analyses.
T. Taniguchi, and P. H. Raabe. Sep 80, 76p
Contract AT03-76SF71023

The analyses reported represent an update of an ongoing probabilistic evaluation of the evolving design of a three-loop, 300-MW(e) demonstration gas-cooled fast breeder reactor (GCFR). Neither the design nor the probabilistic evaluation thereof is complete at this time. While this report does not address risk assessment, it is concerned primarily with the reliability of two portions of the residual heat removal systems, namely, the heat removal trains and the electrical supplies. The results developed thus far have provided useful insights that have had an impact on the evolution of the design. (ERA citation 06:003711)

GA-A-15421 PC **A05**/MF **A01**
General Atomic Co., San Diego, CA.
Comparative Safety Assessment of Upflow Versus Downflow GCFR Core Designs.
M. V. Frank, C. S. Kang, J. T. Reilly, and P. A. Wheeler. Sep 80, 100p
Contract AT03-76SF71023

This report presents a hypothetical core disruptive accident safety assessment and a post-accident fuel containment evaluation which were performed for the upflow versus downflow core design decision for the GCFR. Differences between the upflow and downflow unprotected accident sequences were not significant. However, differences do appear when potential accident mitigation and recriticality prevention design concepts are investigated for the loss of shutdown cooling and flow blockage accidents. An in-vessel molten fuel containment system is preferred over an ex-vessel system for both the upflow and downflow concepts. (ERA citation 06:004875)

NUREG/CR-2135 PC **A04**/MF **A01**
General Electric Co., San Jose, CA.
BWR Refill-Reflood Program TRAC-BWR Component Development,
M. M. Aburomia. Dec 81, 62p GEAP-24941, EPRI/NP-1583

The report describes the development of boiling water reactor (BWR) components that are necessary for the structuring of a best-estimate version of TRAC-BWR. These components are: the jet pumps, the steam separators, and the steam dryers. The component models satisfy their functional specifications and are in accordance with the Transient Reactor Analysis Code (TRAC) basic equations, numerics, and constitutive relations.

NUREG/CR-2256 PC **A19**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Nuclear Energy Systems Div.
PWR FLECHT SEASET Unblocked Bundle, Forced and Gravity Reflood Task Data Evaluation and Analysis Report.
Rept. no. 10,
N. Lee, S. Wong, H. C. Yeh, and L. E. Hochreiter. Sep 81, 431p WCAP-9891, EPRI/INP-2013
Contract NRC-04-77-127
Sponsored in part by Electric Power Research Inst., Palo Alto, CA. See also NUREG-CR-1532, No. 7.

This analysis of the unblocked bundle task data provides further understanding of reflood heat transfer mechanisms, which can be used for assessing prediction models. A new heat transfer correlation has been developed and shown to predict the FLECHT SEASET data as well as the older FLECHT data. The scaling

logic of maintaining the same integrated power per unit flow area has been proved valid, and a method has been developed to calculate steam quality just above the quench front. Improved models for estimating effluence rate and preliminary exploration of the transition zone above the quench front are discussed. Droplet size and velocity data deduced from high-speed movies taken during the tests have led to better understanding of these parameters. A model has been proposed to predict the onset of droplet entrainment, and an analytical expression to predict critical void fraction developed. A network analysis of radiation heat exchange and calculation of convective heat transfer are among efforts expected to give better prediction for heat transfer and wall temperature transients. Recommendations evolving from the data analysis are also included.

NUREG/CR-2261 PC **A07**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Vapor Pressures of Oxide Reactor Fuels Above 3000 K: Review and Perspective,
W. Breitung. Oct 81, 133p SAND-81-1383

Vapor pressures of liquid oxide reactor fuels are among the most important material data required for theoretical analyses of Hypothetical Core Disruptive Accidents in Fast Breeder Reactors. This report is an attempt to completely summarize and critically review the numerous theoretical and experimental results published for the pressure-temperature and pressure-energy relation of unirradiated UO2 and (U,Pu)O2. First--to define the research goal--the precision in the saturation vapor pressure is quantified which is required for the purpose of HCDA calculations. Then the various theoretical and experimental methods used for the determination of p-T and p-U data are reviewed with respect to their principles, results and uncertainties. The achievements of the individual methods are discussed in the light of the research goal and--in view of the widely scattered data--recommendatins are made concerning the p-T and p-U relation of UO2. Finally, the most important future research areas are identified, including some specific research proposals which aim at reducing the still large uncertainties in fuel vapor pressures down to the desired level.

NUREG/CR-2319 PC **A04**/MF **A01**
Los Alamos National Lab., NM.
Three-Dimensional Thermoelastic Analysis of a Fort St. Vrain Core Support Block,
T. A. Butler, and C. A. Anderson. Sep 81, 54p LA-9003-MS

A thermoelastic stress analysis of a graphite core support block in the Fort St. Vrain High-Temperature Gas Cooled Reactor is described. The support block is subjected to thermal stresses caused by a loss of forced circulation accident of the reactor system. Two- and three-dimensional finite element models of the core support block are analyzed using the ADINAT and ADINA codes, and results are given that verify the integrity of this structural component under the given accident condition.

NUREG/CR-2331 PC **A07**/MF **A01**
Brookhaven National Lab., Upton, NY.
Safety Research Programs Sponsored by Office of Nuclear Regulatory Research.
Quarterly progress rept. 1 Apr-30 Jun 81,
R. J. Cerbone, P. Saha, D. J. Diamond, C. Sastre, and Anthony J. Romano. Aug 81, 150p BNL-NUREG-51454-VOL-1-NO-1-2
Contract DE-AC02-76CH00016

The projects reported are the following: HTGR Safety Evaluation, SSC Code Development, Thermal Hydraulic LWR and LMFBR Safety Experiments, RAMONA-3B Code Modification and Evaluation, LWR Plant Analyzer Development Program, LWR Code Assessment and Application, Stress Corrosion Cracking of PWR Steam Generator Tubing, and Standards for Materials Integrity in LWR's.

NUREG/CR-2403 PC **A08**/MF **A01**
Burns and Roe, Inc., Oradell, NJ.
Survey of Insulation Used in Nuclear Power Plants and the Potential for Debris Generation.
Technical rept.,
R. Reyer, E. Gahan, and J. W. Riddington. Oct 81, 175p

In support of Unresolved Safety Issue A-43, 'Containment Emergency Sump Performance,' 11 nuclear power plants representative of different U.S. reactor manufacturers and architect-engineers were surveyed to identify and document the types and amounts of insulation used, location within containment, components insulated, material characteristics, and methods of installation and attachment. A preliminary assessment was made of the potential effects of insulation debris generated as the result of a loss-of-coolant accident (pipe break).

NUREG/CR-2463 PC **A09**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Experimental and Analytical Results of Blast Induced Seismic Studies at HDR,
Gary L. Thinnes, and Richard G. Rahl. Nov 81, 194p EGG-2158
Contract DE-AC07-76IDO1570

NRC's Office of Nuclear Regulatory Research, Division of Engineering Technology has initiated a cooperative effort with Kernforschungszentrum Karlsruhe of the Federal Republic of Germany in the Heissdampfreaktor (HDR) testing program to study the response of nuclear power plant piping systems subjected to ground excitation. The HDR is a decommissioned reactor being used for structural and hydraulic research. EG&G Idaho is supporting the NRC by making analytical comparisons to the tested structural response of the HDR recirculation loop piping to explosive and shaker induced excitations. Acceleration results of linear and nonlinear transient time history analyses are compared to accelerometer data recorded on the piping loop in response to an explosive charge detonated in the ground outside the reactor containment building. Modal analyses were also performed and compared to results of experimental tests which excited the piping system with mechanical shakers.

NUREG/CR-2491 PC **A07**/MF **A01**
Virginia Univ., Charlottesville. Dept. of Nuclear Engineering and Engineering Physics.
Particle Size Distribution from Condensation in ORNL CDV Tests in ARGON.
Technical rept. Jul 80-Jul 81,
K. Chen, and A. B. Reynolds. Dec 81, 135p

Out-of-pile experiments have been developed to study LMFBR fuel (UO2) vaporization and transport in an HCDA-type energy excursion. In these experiments fuel is vaporized by the rapid deposition of electrical energy through the discharge of capacitors. The technique, called Capacitor Discharge Vaporization (CDV), was developed by vaporizing fuel in an argon environment. UO2 particles were produced by both condensation of vapor and fragmentation of liquid. The distribution of the size of the primary UO2 particles that remained airborne after several minutes was measured, and observed particle diameters varied from 0.004 to 0.1 micrometer. The purpose of the research reported here was to develop a model to calculate the measured particle-size distribution.

ORNL/TM-4898 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Operational Method for Demonstrating Fuel Loading Integrity in a Reactor Having Accessible exp 235 U Fuel.
D. R. Ward. Jul 79, 15p
Contract W-7405-ENG-26

The Health Physics Research Reactor is a small pulse reactor at the Oak Ridge National Laboratory. It is desirable for the operator to be able to demonstrate on a routine basis that all the fuel pieces are present in the reactor core. Accordingly, a technique has been devised wherein the control rod readings are recorded with the reactor at delayed critical and corrections are made to compensate for the effects of variations in reactor height above the floor, reactor power, core temperature, and the presence of any massive neutron reflectors. The operator then compares these readings with the values expected based on previous operating experience. If this routine operational check suggests that the core fuel loading might be deficient, a more rigorous follow-up may be made. (ERA citation 05:000975)

ORNL/TM-7177 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Once-Through CANDU Reactor Models for the ORIGEN2 Computer Code.
A. G. Croff, and M. A. Bjerke. Nov 80, 64p
Contract W-7405-ENG-26

Reactor physics calculations have led to the development of two CANDU reactor models for the ORIGEN2 computer code. The model CANDUs are based on (1) the existing once-through fuel cycle with feed comprised of natural uranium and (2) a projected slightly enriched (1.2 wt % exp 235 U) fuel cycle. The reactor models are based on cross sections taken directly from the reactor physics codes. Descriptions of the reactor models, as well as values for the ORIGEN2 flux parameters THERM, RES, and FAST, are given. (ERA citation 06:004848)

ORNL/TM-7211 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Modeling Decay Heat-Induced Melting of a Concrete Slab by Use of the General Heat Conduction Code HEATING 5.
M. L. Tobias. May 80, 39p
Contract W-7405-ENG-26

The problem of the interaction between a reactor-size mass of UO sub 2 generating decay heat and an underlying slab of concrete has been approached through use of the general heat conduction code, HEATING 5. A number of complex effects are considered, including fuel evaporation and concrete dissolution, through user-written subroutines that can be included without disturbing the main portion of the code. The calculated melt front movement rate is about 3.5 x 10 exp -6 m/s at an interface heat flux of about 5 W/cm. Sandia Laboratory experimental data for plasma heating of concrete specimens at 274 W/cm exp 2 , if renormalized to the same heat flux, give a rate of about 2.9 x 10 exp -6 m/s. (ERA citation 05:024095)

ORNL/TM-7334 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Bulk Shielding Facility. Quarterly Report, October-December 1979.
S. S. Hurt, E. D. Lance, and J. R. Thomas. Jul 80, 33p
Contract W-7405-ENG-48

The Bulk Shielding Reactor (BSR) operated at an average power level of 1899 kW for 78.30% of the time during October, November, and December. Water-quality control in both the reactor primary and secondary cooling systems was satisfactory. The Pool Critical Assembly (PCA) was operated on nineteen occasions for the Pressure Vessel Simulator Benchmark experiment. (ERA citation 05:032304)

ORNL-5484 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Pebble Bed Reactor: Core Physics and Fuel Cycle Analysis.
D. R. Vondy, and B. A. Worley. Oct 79, 174p
Contract W-7405-ENG-26

The Pebble Bed Reactor is a gas-cooled, graphite-moderated high-temperature reactor that is continuously fueled with small spherical fuel elements. The projected performance was studied over a broad range of reactor applicability. Calculations were done for a burner on a throwaway cycle, a converter with recycle, a prebreeder and breeder. The thorium fuel cycle was considered using low, medium (denatured), and highly enriched uranium. The base calculations were carried out for electrical energy generation in a 1200 MW/sub e/ plant. A steady-state, continuous-fueling model was developed and one- and two-dimensional calculations were used to characterize performance. Treating a single point in time effects considerable savings in computer time as opposed to following a long reactor history, permitting evaluation of reactor performance over a broad range of design parameters and operating modes. (ERA citation 05:000778)

PB82-148008 PC **A08**/MF **A01**
Washington Univ., St. Louis, MO. Dept. of Civil Engineering.
Analytical Method for Determining Seismic Response of Cooling Towers on Footing Foundations.
Structural engineering research rept.,
Phillip L. Gould, Osama El-Shafee, and Bor-Jen Lee. Oct 81, 169p RR-60, NSF/CEE-81058
Grant NSF-PFR79-00012

The development of a finite element model for the dynamic analysis of an axisymmetric thin rotational shell founded on a shallow ring footing is described. The model was developed using high-precision rotational elements for the shell, isoparametric solid elements for the soil, and an energy transmitting boundary at the ring footing. In a sensitivity study of the equivalent

boundary system to the driving frequency, the stiffness components were found to be more sensitive than damping components and the rotational components were found to be more sensitive than the translational components. Free vibration, response spectrum, and time history analyses of a hyperbolic cooling tower shell showed that the overall flexibility of the shell increased with a decrease in soil stiffness, reducing many forces in the shell proper and especially in the column support from the values calculated when the interaction is neglected. It is suggested that the structural design and resulting behavior of rotational shells can be improved by considering soil-structure interaction.

PB82-861121 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nucleate and Film Boiling: High Temperature Heat Transfer. 1975-January, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 82.
Jan 82, 145p

This bibliography contains abstracts of reports relevant to experimental and analytical studies on boiling conditions and mechanism, heat transfer coefficients, surface conditions, pressure and magnetic field effect of nucleate and film boiling heat transfer. Applications are mainly in the area of nuclear reactors, heat exchangers, steam generators, thermal power systems, and refrigerants. (Contains 134 citations fully indexed and includes a title list.)

PB82-861139 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nucleate and Film Boiling: High Temperature Heat Transfer. 1970-January, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 82.
Jan 82, 262p

Experimental and analytical studies on nucleate and film boiling heat transfer of liquids on different solid materials and surfaces are cited in this bibliography. Modelling, special techniques, and applications of boiling heat transfer to nuclear reactors, refrigerants, desalination, and coatings are also covered. (Contains 294 citations fully indexed and includes a title list.)

PB82-861147 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nucleate and Film Boiling: High Temperature Heat Transfer. 1976-January, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Jan 82.
Jan 82, 246p
Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography includes citations relevant to experimental and theoretical analysis of nucleate and film boiling heat transfer of liquids on different solid materials and geometrical shapes. Testings of materials, thermal fuels, and special devices on boiling heat transfer properties are included. Applications are considered in nuclear reactor design and safety. Modelling, computer programs, liquid metal boiling, and applications in steam generators and thermal power systems are also included. (Contains 254 citations fully indexed and includes a title list.)

SAND-80-1112C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Time-Resolving Sampler to Determine Initial Fuel Aerosols under CDA Conditions.
R. M. Elrick. 1980. 22p CONF-800434-4
Contract AC04-76DP00789
CSNI specialist meeting on nuclear aerosols in reactor safety, Gatlinburg, TN, USA, 15 Apr 1980.

Using close-in, time-resolved sampling of fuel debris, high speed photography and photometric measurement of fuel temperatures the kinetic and thermal states of the disrupting UO sub 2 fuel were defined as it was neutronically heated to vapor by a 5 ms FWHM pulse of 2380 KJ/kg. From these data it was possible to obtain a fuel energy-temperature relation to the melt and debris kinetics in the form of particle distributions in velocity and size for particles from >10 mu m to <3 nm in size. Several calculations and comparisons were made to establish the reliability of the sampling and analysis techniques. (ERA citation 05:032328)

SAND-80-1884 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
LWR Nuclear Power Plant Component Failures.
W. H. Schmidt. Oct 80, 11p
Contract AC04-76DP00789

An analysis of the most significant light water reactor (LWR) nuclear power plant component failures, from information in the computerized Nuclear Safety Information Center (NSIC) data bank, shows that for both pressurized water reactor (PWR) and boiling water reactor (BWR) plants the component category most responsible for reactor shutdowns is valves. Next in importance for PWR shutdowns is steam generators followed by seals of all kinds. For BWR plants, seals, and pipes and pipe fittings are the second and third most important component failure categories which lead to reactor shutdown. The data are for records extending from early 1972 through September 1978. A list of the most significant component categories and a breakdown of the number of component citations for both PWR and BWR reactor types are presented. (ERA citation 06:003720)

UCRL-84151 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Physical Model of Lean Suppression Pressure Oscillation Phenomena: Steam Condensation in the Light Water Reactor Pressure Suppression System (PSS).
E. W. McCauley, G. S. Holman, E. Aust, H. Schwan, and J. Vollbrandt. 1 Apr 80, 15p CONF-800909-2
Contract W-7405-ENG-48
Nuclear reactor safety heat transfer international seminar, Dubrovnik, Yugoslavia, 1 Sep 1980.

Using the results of large scale multivent tests conducted by GKSS, a physical model of chugging is developed. The unique combination of accurate digital data and cinematic data has provided the derivation of a detailed, quantified correlation between the dynamic physical variables and the associated two-phase thermo-hydraulic phenomena occurring during lean suppression (chugging) phases of the loss-of-coolant accident in a boiling water reactor pressure suppression system. (ERA citation 05:032329)

WAPD-TM-1347 PC **A04**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Fuel Rod-Grid Interaction Wear: In-Reactor Tests (LWBR Development Program).
R. M. Stackhouse. Nov 79, 61p
Contract EY-76-C-11-0014

Wear of the Zircaloy cladding of LWBR irradiation test fuel rods, resulting from relative motion between rod and rod support contacts, is reported. Measured wear depths were small, 0.0 to 2.7 mils, but are important in fuel element behavior assessment because of the local loss of cladding thickness, as well as the effect on grid spring forces that laterally restrain the rods. An empirical wear analysis model, based on out-of-pile tests, is presented. The model was used to calculate the wear on the irradiation test fuel rods attributed to a combination of up-and-down motions resulting from power and pressure/temperature cycling of the test reactor, flow-induced vibrations, and assembly handling scratches. The calculated depths are generally deeper than the measured depths. (ERA citation 05:017710)

WAPD-TM-1384 PC **A03**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Finite Deformation Analysis of Continuum Structures with Time Dependent Anisotropic Elastic Plastic Material Behavior (LWBR/AWBA Development Program).
D. N. Hutula. Mar 80, 27p
Contract AC11-76PN00014

A finite element procedure is presented for finite deformation analysis of continuum structures with time-dependent anisotropic elastic-plastic material behavior. An updated Lagrangian formulation is used to describe the kinematics of deformation. Anisotropic constitutive relations are referred, at each material point, to a set of three mutually orthogonal axes which rotate as a unit with an angular velocity equal to the spin at the point. The time-history of the solution is generated by using a linear incremental procedure with residual force correction, along with an automatic time step control algorithm which chooses time step sizes to control the accuracy and numerical stability of the solution. (ERA citation 05:032254)

WAPD-TM-1462 PC **A04**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Critical Heat Flux Experiments in a Circular Tube with Heavy Water and Light Water. (AWBA Development Program).
C. L. Williams, and S. G. Beus. May 80, 69p
Contract AC11-76PN00014

Experiments were performed to establish the critical heat flux (CHF) characteristics of heavy water and light water. Testing was performed with the up-flow of heavy and of light water within a 0.3744 inch inside diameter circular tube with 72.3 inches of heated length. Comparisons were made between heavy water and light water critical heat flux levels for the same local equilibrium quality at CHF, operating pressure, and nominal mass velocity. Results showed that heavy water CHF values were, on the average, 8 percent below the light water CHF values. (ERA citation 05:032255)

18J. Reactor Materials

GA-A-15612 PC **A07**/MF **A01**
General Atomic Co., San Diego, CA.
Pre- and Postirradiation Evaluation of TRISO ThO sub 2 Particles Irradiated in Capsule HT-34.
C. A. Young, and C. S. Jones. Oct 80, 148p
Contract AT03-76ET35300

Capsule HT-34 was irradiated jointly by General Atomic Company (GA) and Oak Ridge National Laboratory (ORNL). This report presents the pre- and postirradiation evaluation conducted by GA. The purpose of the test was to characterize the mechanical and chemical performance and fission product release of TRISO ThO sub 2 particles. Sixteen TRISO ThO sub 2 samples, which had been fabricated in the production-line (240-mm-ID) coater, were irradiated at approximately 1200 and 1450 exp 0 C to neutron fluences of 5.1 to 10.2 x 10 exp 25 n/m exp 2 ($E > 29$ fJ)/sub HTGR/, and burnups of 5.1 to 12.7% FIMA. Following are the results of the postirradiation examination: the OPyC coating failure of the 800- mu m-diameter particles irradiated at 1200 exp 0 C was less than or equal to 1.8%; the pressure-vessel model overpredicted failure up to seven times the observed failure for the samples irradiated at 1200 exp 0 C; palladium attack and internal corrosion of the SiC coating was observed in the samples irradiated at 1200 exp 0 C; internal corrosion of the SiC coating caused SiC failure up to 100% in the samples irradiated at 1450 exp 0 C; and an average of 16 and 90% of the Cs was released from failed particles irradiated at 1200 and 1450 exp 0 C, respectively, after 2686 h of irradiation. (ERA citation 06:009136)

GA-A-15969 PC **A09**/MF **A01**
General Atomic Co., San Diego, CA.
Pre- and Postirradiation Evaluation of Fuel in Capsule HRB-14.
C. A. Young. Sep 80, 185p
Contract AT03-76ET35300

Capsule HRB-14 was irradiated jointly by Oak Ridge National Laboratory and General Atomic Company (GA). This report covers the pre- and postirradiation characterization and evaluation of the GA fuel. The experiment was primarily to characterize the irradiation performance of TRISO-coated low-enriched (Th,U)O sub 2 , UC sub 0 sub 7 O sub 0 sub 5 , and UO sub 2 particles and TRISO ThO sub 2 particles. Twenty cured-in-place fuel rods containing the fuel particles were irradiated at 960 exp 0 to 1130 exp 0 C. The fluence was 4.5 to 8.3 x 10 exp 25 n/m exp 2 ($E > 29$ fJ)/sub HTGR/. The fertile burnup was 4.1% to 8.5% fissions per initial metal atom (FIMA); the mixed oxide burnup was 14.5% to 19.3% FIMA; the uranium fissile burnup was 27.9% to 29.5% FIMA. (ERA citation 06:004788)

NUREG-0867 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Material Safety and Safeguards.

The Effects of Natural Phenomena on the Atomics International Nuclear Materials Development Facility at Santa Susana, California, Docket No. 70-25.
Dec 81, 49p

An analysis of the Effects of Natural Phenomena on the Atomics International Nuclear Materials Development Facility at Santa Susana, California has been prepared by the Office of Nuclear Material Safety and Safeguards. The analysis is in support of the Special Nuclear Materials License held by the subject company. It addresses the probable effects of damage to the General Electric Plant by severe weather and earthquake and expresses the consequences of damage as dose to several human receptors. The doses that result from facility damage are multiplied by the occurrence rate for the initiating event yielding the yearly risk.

ORNL/TM-6924 PC **A14**/MF **A01**
Oak Ridge National Lab., TN.
Gel-Sphere-Pac Reactor Fuel Fabrication and Its Application to a Variety of Fuels.
A. R. Olsen, and R. R. Judkins. Dec 79, 303p
Contract W-7405-ENG-26

The gel-sphere-pac fuel fabrication option was evaluated for its possible application to commercial scale fuel fabrication for 19 fuel element designs that use oxide fuel in metal clad rods. The dry gel spheres are prepared at the reprocessing plant and are then calcined, sintered, inspected, and loaded into fuel rods and packed by low-energy vibration. A fuel smear density of 83 to 88% theoretical can be obtained. All fuel fabrication process steps were defined and evaluated from fuel receiving to finished fuel element shipping. The evaluation also covers the feasibility of the process, the current status of technology, estimates of the required time and cost to develop the technology to commercial status, and the safety and licensability of commercial scale plants. The primary evaluation was for a Light-Water Reactor fuel element containing (U,Pu)O sub 2 fuel. The other 18 fuel element types - 3 for Light-Water Reactors, 1 for a Heavy-Water Reactor, 1 for a Gas-Cooled Fast Reactor, 7 for Liquid-Metal-Cooled Fast Breeder Reactors, and 3 pairs for Light-Water Prebreeder and Breeder Reactors - were compared with the Light-Water Reactor. The gel-sphere-pac option was found applicable to 17 of the 19 element types; the characteristics of a commercial scale plant were defined for these for making cost estimates for such plants. The evaluation clearly shows the gel-sphere-pac process to be a viable fuel fabrication option. Estimates indicate a significant potential fabrication cost advantage for the gel-sphere-pac process if a remotely operated and remotely maintained fuel fabrication plant is required. (ERA citation 05:005420)

ORNL/TM-6984 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Actinide Partitioning-Transmutation Program Final Report. IV. Miscellaneous Aspects.
C. W. Alexander, and A. G. Croff. Sep 80, 81p
Contract W-7405-ENG-26

This report discusses seven aspects of actinide partitioning-transmutation (P-T) which are important in any complete evaluation of this waste treatment option but which do not fall within other major topical areas concerning P-T. The so-called miscellaneous aspects considered are (1) the conceptual design of a shipping cask for highly neutron-active fresh and spent P-T fuels, (2) the possible impacts of P-T on mixed-oxide fuel fabrication, (3) alternatives for handling the existing and to-be-produced spent fuel and/or wastes until implementation of P-T, (4) the decay and dose characteristics of P-T and standard reactor fuels, (5) the implications of P-T on currently existing nuclear policy in the United States, (6) the summary costs of P-T, and (7) methods for comparing the risks, costs, and benefits of P-T. (ERA citation 06:000270)

RFP-2979 PC **A04**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Literature Search for the Non-Aqueous Separation of Zinc from Fuel Rod Cladding.
R. L. Sandvig, S. J. Dyer, G. A. Lambert, and C. E. Baldwin. 21 Jun 80, 68p
Contract AC04-76DP03533

This report reviews the literature of processes for the nonaqueous separation of zinc from dissolved fuel assembly cladding. The processes considered were distillation, pyrochemical processing, and electrorefining. The last two techniques were only qualitatively surveyed while the first, distillation, was surveyed in detail. A survey of available literature from 1908 through 1978 on the distillation of zinc was performed. The literature search indicated that a zinc recovery rate in excess of 95% is possible; however, technical problems exist because of the high temperatures required and the corrosive nature of liquid zinc. The report includes a bibliography of the surveyed literature and a computer simulation of vapor pressures in binary systems. 129 references. (ERA citation 05:031651)

RFP-3104 PC **A03**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Chemistry Research and Development Progress Report, May 1979 Through October 1979.
F. J. Miner. 21 Nov 80, 44p
Contract AC04-76DP03533

Thermodynamics of plutonium hydrides is being studied. Recovery of Am and Pu from various media is under investigation. A process for decontaminating Rocky Flats soil was tested. An improved process for plutonium peroxide precipitation was developed. exp 242 Pu metal tracer disks were cast. Application of a tilt-pour furnace to the pyroredox process for Pu purification is being investigated. Other pyrochemical processes are being studied. Removal of Zn, Mg, and Ca from Pu is being studied. 11 figures, 11 tables. (ERA citation 06:003509)

SAND-80-1919C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Computerized Nuclear Material System at Sandia National Laboratories.
J. L. Tischhauser. 1980, 14p CONF-800655-31
Contract AC04-76DP00789
21. annual meeting of the Institute of Nuclear Materials Management, Palm Beach, FL, USA, 30 Jun 1980.

SNLA developed and implemented a nuclear material control and accountability system on an HP 3000 minicomputer. The Sandia Nuclear Materials Computer System (SNMCS) which became operative in January 1980 provides: control of shipments and receivals of nuclear material, control of internal transfers of nuclear material, automated inventory with a bar code system, control of inventory adjustments, automated reporting/transmitting to other contractors and operations offices, automated ledgers and journals for material weights and costs, and interface to the Albuquerque Operations Office (ALO) Automated 741 System. (ERA citation 05:031713)

VTT-MET-26 PC **A02**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Espoo (Finland). Metalliilaboratorio.
Strain Ageing of Nuclear Pressure Vessel Steels A533B and A508 Cl.2.
R. Pelli, and K. Toerroenen. Apr 78, 22p
U.S. Sales Only.

The susceptibility of the reactor pressure vessel steels A533B and A508 cl.2 to strain ageing has been studied using conventional tensile and impact testing of prestrained and aged specimens. The results show a modest susceptibility, seen as an increase in yield strength and Charpy V transition temperatures. The effect of varying alloying additions within the range of normal production was not observed, but the initial mechanical properties clearly affect the strain ageing. The lower the initial yield strength, the higher increase in strength and the lower increase in transition temperature is observed. (Atomindex citation 10:444561)

VTT-MET-35 PC **A02**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Espoo (Finland). Metalliilaboratorio.
Reactor Pressure Vessel Steels ASTM A533B and A508 Cl. 2. Programme Description.
K. Toerroenen, and R. Pelli. Oct 78, 11p
U.S. Sales Only.

This report presents the description of the research programme concerning the reactor pressure vessel steels ASTM A533B A533B and A508 Cl.2. The main aim of the programme is to gather and create adequate information needed in national efforts devoted to the assessment of the structural integrity of the reactor pressure vessels made of the steels concerned. An additional objective is to generate technical data for pressure vessel manufacturing, especially heat treating. (Atomindex citation 10:444620)

VTT-MET-36 PC **A02**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Espoo (Finland). Metalliilaboratorio.
Reactor Pressure Vessel Steels ASTM A533B and A508 Cl.2. Heat Treatment Programmes.
R. Pelli, M. Kemppainen, and K. Toerroenen. Oct 78, 18p
U.S. Sales Only.

This report describes the heat treatment programmes utilized in connection with a research programme concerning the reactor pressure vessel steels ASTM A533B and A508 Cl.2. (Atomindex citation 10:444562)

18M. Reactors (Non-Power)

PB82-145236 PC **A03**/MF **A01**
Norsk Treteknisk Inst., Oslo.
Structural Models for Trussed Rafters (Statiske Modeller for Tretakstoler),
Odd Brynildsen. 1979, 28p MEDDELELSE-59
Text in English, summary in Norwegian. Also pub. as ISSN-0546-3637.

The computer program TRUDE (TRUss DEsign) for design of trussed rafters with nail plate connectors has been used commercially for a couple of years by a number of Norwegian truss manufacturers. The program has been developed at Norsk Treteknisk Institutt and is based on the finite element method. The paper presents a comparison between TRUDE-computed span tables and span tables derived from prototype tests as given in BS CP112:Part 3:1973. The paper presents further test results on one full scale truss and the attempts to reproduce the test results analytically by the use of different structural models. The last part of the paper compares calculated span tables using the different structural models. The last part of the paper compares calculated span tables using the different structural models. The design of the nail plate connectors is not dealt with in this paper.

19.

ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A108 200/7 PC **A02**/MF **A01**
System Planning Corp., Arlington, VA.
Technical Support for the Tank Breaker Program.
Final technical rept. 20 Oct 80-31 Oct 81,
James Meni. Oct 81, 8p Rept no. SPC-81-3591
Contract MDA903-81-C-0064, ARPA Order-4115

A series of tasks was performed for the Tank Breaker Program Manager (PM). This document addresses those efforts. The Tank Breaker antitank missile concept was developed in FY 79. This fire-and-forget, manportable missile system is based on a staring focal plane array seeker and employs advanced guidance and control concepts that result in impacts against the top armor of tanks. This missile is also effective against other battlefield targets, such as bunkers, and offers high operational flexibility.

AD-A108 346/8 PC **A04**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistic Research Lab.
Telemetry Results with the M456A1E2 Projectile--Series 3.
Final rept.,
Wallace H. Clay, William H. Mermagen, and William Y. Tenly. Oct 81, 67p Rept no. ARBRL-MR-03146
Supersedes Rept. no. ARBRL-IMR-673 dated Mar 80.

Four high-explosive anti-tank projectiles, M456A1E2, were instrumented to measure various a.c. and d.c. voltages in the piezoid/switch/fuze circuit during flight. Three of the four rounds transmitted. Experimental results show a.c. signals present on the FFAIS (Full Frontal Area Impact Switch) and the detonator. The resistance of the detonator was measured and determined to be 600-900 ohms indicating that the fuze was armed and detonator intact. A d.c. voltage of 650 volts on the FFAIS was measured for one round and 0.0 volts d.c. for the other two rounds. There was no data to indicate why a zero-volt level exists. A survey of previous telemetry results reveals that the zero-volt level at the FFAIS existed on a total of three of six rounds. The absence of a d.c. voltage on the FFAIS could result in a non-functioning of the M456A1E2 projectile on glancing impact. (Author)

AD-A108 542/2 PC **A02**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Description of 'Hot Spots' Associated with Localized Shear Zones in Impact Tests.
Research rept. Oct 79-Sep 80,
C. Stephen Coffey, and Ronald W. Armstrong. 21 Oct 81, 22p Rept no. NSWC/TR-80-499

A heat sensitive film technique has been employed to give spatial resolution to the observation of 'hot spots' in the impact deformation of soft ionic or molecular crystals and in crystal-filled polymer composites. The temperature of these 'hot spots' is estimated to exceed 250 C for even modest impact loads. The heating is interpreted to depend on local shear deformation. The rise in temperature associated with the movement of a number of equally-spaced dislocations is re-examined. An additional multiplicative effect for the temperature rise due to the dislocation number is obtained if the dislocations are released as a pile-up avalanche from an internal obstacle. This rise in temperature carries over to the association of localized heating of 'hot spots' with cracking within polymers because of the equivalence in the continuum approximation of a dislocation pile-up and a physical crack. Two reasons for the heating effect being especially important at cracking sites are that they are typified by the largest internal concentrations of stress which the material can bear before local fracture occurs, and, in so doing, the new crack surfaces supply a ready 'sink' for the dissipation of the internal energies at the tips of shear zones.

AD-A108 586/9 PC **A02**/MF **A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
Functioning Time of Impact Fuzes.
Final rept. on test operations procedure.
8 Dec 81, 14p Rept no. TOP-4-2-807
Supersedes rept. no. MTP-4-2-807 dtd 28 Dec 66, AD-717 076.

Describes procedures for measuring the functioning time of impact fuzes for artillery, mortar, recoilless rifle, and tank ammunition with a high-speed framing camera and smear (shutterless) camera. It does not cover weapon-firing conditions, such as elevation, zone, temperature, and sample size. (Author)

AD-B058 448/2 PC **A05**/MF **A01**
Arizona Univ., Tucson. Dept. of Chemistry.
Investigating Combustion Excitation and Emission Phenomena in Pyrotechnic Flares.
Final technical rept.,
M. Bonner Denton. Feb 81, 96p
Contract N00019-79-C-0609
Distribution limitation now removed.

Studies into the implementation and use of computer automated high-speed mapping techniques are described. Consideration involved in the development of experimental hardware and software are discussed. Data is presented detailing the systems' present performance. (Author)

MHSMP-80-45 PC **A02**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Amination of Trichlorotrinitrobenzene.
J. G. Locke. 1980, 9p
Contract AC04-76DP00487

A ring sparger has been used for ammonia introduction in the batchwise amination of trichlorotrinitrobenzene to form triaminotrinitrobenzene. This has been done at high specific production rates but with limited success in producing large particle size material. (ERA citation 06:006440)

MHSMP-80-55 PC **A02**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Analysis of RDX and HMX in PBX 9404 by High Performance Liquid Chromatography.
B. R. Richardson. Nov 80, 12p
Contract AC04-76DP00487

An analysis for the HMX and RDX contents of PBX 9404 has been developed. Instrumental parmeters, such as column type, solvent, flow rate, and method of detection are discussed. The calibration method is examined, and precision and accuracy investigated. The average percent recovery of HMX is 98.75% with a standard deviation of 0.82%; for RDX, the percent recovery is 98.66% with a standard deviation of 0.27%. (ERA citation 06:005247)

MHSMP-80-56 PC **A02**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
RX-26-AY/AF Rifle Bullet Tests.
D. D. Sharp. Nov 80, 9p
Contract AC04-76DP00487

A series of rifle bullet tests was performed on two explosives, RX-26-AY and RX-26-AF, using the Pantex version of the Picatinny Arsenal Test (PA-2). With the exception of one test, both explosives displayed a relatively low sensitivity to bullet impact. However, a marked difference was noted in the average burn time duration between the two types of explosives being tested. A minor modification was made on the rifle barrel used at the test site in order to improve the sighting procedure. (ERA citation 06:005248)

SAND-80-0245C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Development of a Shock-Initiated, Through-Bulkhead Actuator.
A. C. Schwarz, and M. R. Kopczewski. 1980, 14p CONF-800713-4
Contract EY-76-C-04-0789
International pyrotechnics seminar, Vail, CO, USA, 14 Jul 1980.

The design status of a shock-initiated, through-bulkhead, valve actuator is presented. The design, which relies on a new concept - shock initiation of a pyrotechnic - consists of a high explosive donor (hexanitroazobenzene or HNAB) and a pyrotechnic acceptor (TiH/sub .65//KClO sub 4) separated by a steel bulkhead. Donor detonation results in shock initiation of the acceptor while maintaining integrity of the bulkhead. The output of the donor was characterized by VISAR (Ref. 1) measurement techniques; two methods of controlling the output are discussed. The bulkhead, made of stainless steel, type 304L, condition A, was designed by a combination of experimental and analytical techniques to assure both reliable function and integrity. The choice of TiH/sub .65//KClO sub 4 for the acceptor was based on its known shock initiation properties. The actuator was shown to be successful in valve performance tests. (ERA citation 05:022867)

SAND-80-0427C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Shock Compaction of a Porous Pyrotechnic Material.
L. M. Lee, and A. C. Schwarz. 1980, 18p CONF-800713-5
Contract EY-76-C-04-0789
International pyrotechnics seminar, Vail, CO, USA, 14 Jul 1980.

The results of an experimental program to generate Hugoniot data for an unreacted pyrotechnic material are discussed and the data presented. The program included both sample fabrication and experimental determination of stress-particle velocity Hugoniot data for the pyrotechnic, titanium hydride-potassium perchlorate (TiH sub 2 -KClO sub 4), at two densities. The TiH sub 2 -KClO sub 4 , which was supplied as a powder mixture, was pressed to the desired bulk sample density and size using a ram and die technique. Samples were produced with nominal 2.02 or 2.27 g/cm exp 3 densities. Hugoniot data were generated on the porous pyrotechnic samples using standard flat plate impact techniques. The experimental program provided information defining the shock compaction behavior of porous TiH sub 2 -KClO sub 4 up to 70 kbar. The Hugoniot data for both sample densities indicated full compaction was achieved in the 15 to 20 kbar stress range. (ERA citation 05:024430)

UCID-18814 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Fast Detonator-Activated Ball Shutter for High Explosive Experiments.
R. A. McWilliams, and W. G. Von Holle. 19 Sep 80, 7p
Contract W-7405-ENG-48

A detonator-activated ball shutter has been developed to protect the quartz windows in a 10 gm shot chamber used for optical-laser experiments on detonating high explosives. (ERA citation 06:005249)

UCRL-52921 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Design of a Maze Structure to Attenuate Blast Waves.
C. M. Bacigalupi. 19 Mar 80, 18p
Contract W-7405-ENG-48

Building criteria for cells used to process and store high explosives dictated maze-type entries, to avoid mechanical closure devices. Experiments were conducted to develop a minimum-cost maze configuration that would limit the effects of an accidental 10-kg detonation to acceptable levels (<15 psig reflected) in adjacent areas. Components of suppressive design that were considered were right-angle turns, blast deflectors, baffles (reduced-area openings), and energy-absorbing materials. The proposed configuration uses multiple baffles and a blast deflector to reduce the exit pressure to about 8 psig reflected. (ERA citation 05:034105)

UCRL-82723 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Thermogravimetric Study of TATB and Two TATB-Based Explosives.
R. G. Garza. 9 Nov 79, 14p CONF-791079-2
Contract W-7405-ENG-48
DOE compatibility meeting, Aiken, SC, USA, 16 Oct 1979.

Basic physical properties of TATB (1,3,5-triamino, 2,4,6-trinitrobenzene) and TATB-based PBX's (plastic-bonded explosives) are needed, particularly to provide valid estimates of their long term thermal stability. Their thermal behavior in vacuum was studied by measuring the vapor pressures of TATB and two TATB-based PBX's. The equilibrium sublimation pressures and heats of sublimination of TATB and PBX's were determined in the temperature range of 150 to 200 exp 0 C. (ERA citation 05:006143)

19C. Combat Vehicles

AD-A108 281/7 PC **A02**/MF **A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
Vehicle Characteristics.
Final rept. on test operations procedure.
3 Dec 81, 11p Rept no. TOP-2-2-500
Supersedes Rept. no MTP-2-2-500 dated 4 Aug 65, AD-717 989.

This TOP summarizes all of the physical characteristics (as defined in AR 310-251) to be obtained during testing of vehicles and their components undergoing a developmental test II (ET), as prescribed in AR 70-10. It also provides guidance for developing characteristics data sheets.

PAT-APPL-6-321 502 Not available NTIS
Department of the Army, Washington, DC.
Interchangeable Fixed or Damped Towing System.
Patent Application.
Davis L. Hemmings. Filed 16 Nov 81, 8p AD-D009 032/4
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a towing system for a trailer, particularly a towing system that can be economically changed to utilize either a fixed non-damped towing

mechanism or a damped towing mechanism. The term fixed non-damped denotes a rigid, nonextensible connection between the trailer and towing vehicle. the term 'damped' denotes a hydraulic shock-absorber type connection between the trailer and towing vehicle. The present invention contemplates modifications to a convention two wheel a-frame trailer front end to enable the a-frame to receive either a fixed non-damped towing system or a damped towing system. towing system interchangeability is especially useful in military vehicles where a given vehicle may be required to handle different types of cargo from one day to the next.

PATENT-4 254 970 Not available NTIS
Department of the Army, Washington, DC.
Vehicle Suspension Using Pressurized Bourdon Tubes.
Patent,
Ernest N. Petrick. Filed 10 Dec 79, patented 10 Mar 81, 6p AD-D009 024/1, PAT-APPL-6-101 932
Supersedes PAT-APPL-6-101 932.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent describes a vehicle suspension especially for tracked vehicles, comprising an internally pressurized Bourdon tube operatively located between the sprung mass and each road wheel. A single liquid pump can be used to selectively pressurize different ones of the Bourdon tubes to different pressure values in accordance with expected loadings for particular ones of the road wheels. Depressurization of all Bourdon tubes can be used for vehicle height control, as for example to reduce the silhouette of a military vehicle and/or reduce ground clearance. (Author)

19D. Explosions, Ballistics, and Armor

AD-A108 205/6 PC **A03**/MF **A01**
Weapons Systems Research Lab., Adelaide (Australia).
A Data Acquisition and Processing System for Gun Interior Ballistic Studies. Part I.
Technical rept.,
A. R. Rye. May 81, 40p Rept no. WSRL-0209-TR

A data acquisition and processing system for use in the gun ballistic ranges of Propulsion Division, WSRL, is described. Adaptability and economy are achieved by the use of digital transient recorders interfaced to a Hewlett-Packard 9825A Desktop Computer. In one case, minor hardware changes were required. Flexible software has been developed, encoded in Hewlett-Packard's 'HPL' programming language. Full software details are given for reference by system users wishing to make modifications. (Author)

N82-13163/2 PC **A04**/MF **A01**
Erprobungsstelle der Bundeswehr, Meppen (Germany, F.R.).
Transitional Ballistics of Hypervelocity Projectiles.
J. K. Biele. 1980, 57p BMVG-FBWT-80-1
Partly in German and English. Sponsored by Bundesministerium der Verteidigung.

The state of the art of transitional ballistics of hypervelocity fin-stabilized projectiles is described, particularly sabot launching from smoothbore guns. The influence of gun-tube vibration and aerodynamic jump on near-muzzle flight direction errors and dispersion is established whereas the gas dynamical effects are shown to be negligible. Detection techniques for gun-tube vibration are discussed and it is shown that muzzle contact and sabot separation induced trajectory perturbations can be observed by means of an electromechanical method, using (nontouching) inductive gages as well as strain gages. Results describing the firing of an 105 mm smoothbore tank gun are presented and analyzed for muzzle influence on free flight behavior.

PAT-APPL-6-297 294 PC **A03**/MF **A01**
Department of the Army, Washington, DC.
System for Measuring Plate Deformation Produced by Explosive Shock Waves, and Motion-Sensing Accelerometer Transducer Used Therein.
Patent Application,
Anthony San Miguel. Filed 28 Aug 81, 29p AD-D009 034/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A novel testing system is described which utilizes a novel subcombination multiple pin/probe type motion-sensing accelerometer transducer, capable of sensing exceptionally high levels of structural motion, in the domain of from about 1,000,000 to 10,000,000 Gs (force of gravity). Such motion may be imparted by shock wave forces generated by detonation of high energy ballistic and/or land mine charges, thereby generally deforming some portions of closely adjacent, high strength structures such as steel armor plate being tested. This novel accelerometer transducer comprises at least two and preferably from six to eight potentially deformable pin-like contact probes preferably of pure annealed metal which preferably project from both sides of a support fixture. When the power source is 'on', pin-plate contact resuting from such blast deformation force progressively energizes the respective subcircuits, from which the timed differences between contacts and other data are measured and used primarily to novelly compute instantaneous velocity and average acceleration of such deformation.

PAT-APPL-6-297 295 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Composite Floor Armor for Military Tanks and the Likes.
Patent Application,
Anthony San Miguel. Filed 28 Aug 81, 18p AD-D009 033/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A novel composite armor for armored vehicles which attenuates mine blast loading better than monolithic steel armor plate of equal areal density without structural fracture. The disclosed composite armor, particularly used as vehicle floor armor, is designed so as to greatly enhance not only crew survivability, by markedly reduced compressive shock effect, but also vehicular integrity. The novel composite armor in most preferred embodiments comprises layers of high density steel honeycomb, balsa wood, and ballistic-resistant nylon such as KEVLAR, sandwiched in various arrangements between outer layers of steel armor plate.

SAND-78-1154 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
PENOB: A Modification of the PENAP Code to Treat Oblique Impact of Earth Penetrators.
P. Yarrington, F. R. Norwood, and N. K. Ruiz. Feb 80, 47p
Contract AC04-76DP00789

As a direct extension of the work on normal penetration, effort was directed to develop analytical techniques for treating oblique impact (nonzero angle of attack and impact angle). The PENOB code was developed for this purpose from the equations of the PENAP axisymmetric earth penetration program. To treat oblique impact problems, the boundary conditions on the penetrator-soil interface are allowed to vary around the penetrator circumference. In general, peak lateral loads predicted by PENOB were fond to be larger (by factors of 1.5 to 2.0) than those obtained by earlier approximate methods. 8 figures, 5 tables. (ERA citation 05:028144)

UCRL-52867 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Elastic-Wave Radiation from Spherical Sources.
H. C. Rodean. 7 Dec 79, 28p
Contract W-7405-ENG-48

The radiation of spherical compressional waves from a spherical cavity in an ideal elastic solid is treated. The equations for the radiation source and field are written in terms of the reduced-displacement potential. The source equation is studied in terms of characteristic frequencies, corresponding periods and wavelengths, and damping. The field equations for the stresses, strains, radial displacement, etc., are reviewed with regard to the transitions between the near and far fields. The natural parameters for defining the dynamic source and field characteristics are 2b/R and b/a in some cases and a/R in others, where a is the compressional-wave velocity, b the shear-wave velocity, and R the cavity radius. Transient solutions for stresses, strains, radial displacement, etc., include damped sinusoidal oscillations. The initial- and final-value theorems for the Laplace transform are used to obtain solutions for tau (reduced time) implies 0 + (high-frequency, farfield) and tau implies infinity (zero-frequency, near-field). 14 figures, 4 tables. (ERA citation 05:014448)

19F. Guns

PATENT-4 262 578 Not available NTIS
Department of the Army, Washington, DC.
Cartridge Ejector.
Patent,
William R. Bains. Filed 8 Jun 79, patented 21 Apr 81, 4p AD-D009 018/3, PAT-APPL-6-047 595
Supersedes PAT-APPL-6-047 595.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a cartridge ejector for a recoil-operated gun. In prior art guns of the recoil-operated type if the gun fails to fire the lack of recoil force prevents the gun from continuing to fire. To allieviate this situation a manually-controlled charging mechanism is operated to draw the bolt carrier back to the full recoil position. Under the present invention the charging mechanism is augmented by a spring-urged piston that propels a special striker arm against the ejector rod carried by the bolt assembly. The ejector rod forcibly impacts the base of the unfired cartridge to eject it from the gun.

PATENT-4 299 158 Not available NTIS
Department of the Air Force, Washington, DC.
Last Round Detection Device.
Patent,
Anthony J. Aloi, and Robert J. Fritz. Filed 26 Nov 79, patented 10 Nov 81, 8p AD-D009 058/9, PAT-APPL-6-097 462
Supersedes PAT-APPL-6-097 462, AD-D006 890.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The devices is for use with an ammunition storage drum for a modern multi-barrel high rate-of-fire machine gun (i.e., Gatling type gun) system, in which unfired ammunition rounds are transported from the drum to the gun, and the cases of the spent ammunition are returned from the gun to the drum. When two generally, oppositely positioned spent ammunition sensors within the drum simultaneously detect spent ammunition in the drum, a signal is sent to the gun control unit in time to cut off power. The device prevents spent ammunition from being chambered in the gun, and as a result also permits higher rates-of-fire by the gun. (Author)

19G. Rockets

AD-A108 271/8 PC **A04**/MF **A01**
Northeastern Univ., Boston, MA. Electronics Research Lab.
Design of Sounding Rocket Payloads.
Final rept. 1 May 76-30 Apr 81,
Richard L. Morin, and Lawrence J. O'Connor. 1 Jul 81, 72p AFGL-TR-81-0235
Contract F19628-76-C-0152

This report is a summary of work accomplished from 1 May 1976 to 30 April 1981. Contract efforts were in the design, fabrication, testing, and launch support of sounding rocket payloads and related ground support equipment. Specific areas of work related to this report include: payload structures, component packaging, deployment and eject mechanisms, diagnostic components, in-flight sequencing, power systems and control consoles. Also described are electrical and mechanical interfaces with experiments, telemetry systems, attitude control systems, recovery systems and other payload subsystems.

20. PHYSICS

20A. Acoustics

AD-A108 540/6 PC **A02**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
Effect of Air Content on Broadband Noise Measurements in the 1.22-m Diameter Water Tunnel.
Technical memo.,
B. E. Robbins, and D. E. Thompson. 11 Aug 81, 18p Rept no. ARL/PSU/TM-81-166
Contract N00024-79-C-6043

The effect of air content on broadband radiated noise in the 1.22-m diameter water tunnel was investigated. In addition, tunnel operating pressure was also varied. The transmitting hydrophone was positioned in the tail of an axisymmetric body mounted in the test section. Two receiving transducers were used. Both showed a somewhat systematic change in broadband spectral levels with variations in air content up to 11 parts per million and variations in pressure. (Author)

AD-A108 569/5 PC **A07**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
Differential Sound Absorption Technique and Effect of Ion-Pairing and Pressure on Sound Absorption in Seawater and Aqueous Mixtures of Magnesium Sulfate and sodium Chloride.
Summary rept.,
Cheng-chih Hsu. 1 Nov 81, 135p Rept nos. MPL-U-71/81, SIO-REF-81-34
Contracts N00014-79-C-0472, N00014-80-C-0674
Sponsored in part by Grant NSF-OCE78-25123.

Sound absorption in the ocean between 5 kHz and 350 kHz is principally due to the relaxation process associated with a pressure dependent chemical reaction of MgSO4. This research has resolved two conflicts regarding the effect of pressure on sound absorption and relaxation frequency due to MgSO4 in sea water and the reduction of sound absorption by the addition of up to 0.6 M NaCl to low concentration (0.02M) solution of NaCl. The reduction of absorption in MgSO4 solution upon the addition of NaCl can be accounted for theoretically by Debye-Huckel theory and by formation of MgCl(+) and NaSO4 ion-pairs. The measured reduction is less than that observed by Kurtze and Tamm, however. At this concentration of MgSO4, the effects of ionic strength and ion-pairing are about equal. The results are consistent with disassociation constants of 0.0062, 0.1, 0.178 for the MgSO4, NaSO4(-) and MgCl(+) ion-pairs, respectively up to 0.12 M NaCl addition. For 0.6M NaCl additions to 0.02 M MgSO4, the absorption results cannot be explained by either simple Debye-Huckel theory, the Johnson and Pytkowicz model of ion-pairing nor the Pitzer approach. The values of maximum absorption per wavelength were determined to an absolute accuracy of about 1% from .000080 to .000016. For the differential absorption measurements in MgSO4 and NaCl mixtures, the measurement accuracy is sufficient for quantitative studies of ion-pairing in electrolyte mixtures, particularly for unsymmetrical salts.

AD-A108 590/1 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Noise Control Lab.
Meteorological Models for Application to Acoustic Ray Tracing in the Atmosphere.
Interim rept.,
Edward V. Welser. Apr 80, 13p
Contract DAAD07-80-C-0001

Sound propagation in the atmosphere is affected by vertical temperature and wind gradients. These gradients produce a refracting medium in which sound speed is a function of height. A single sound speed profile as a function of height above the ground can be obtained from individual temperature and wind gradients via empirically derived equations or measured directly or indirectly with sounders. The temperature and wind effects can, therefore, be considered collectively, for acoustic purposes, as a variation of sound speed with height. A mathematical sound ranging model must effectively incorporate vertical sound velocity gradients. The computer programs developed to model sound propagation using ray techniques presented by Roth require as input either the vertical temperature and wind profiles or the vertical sound velocity profile. It is assumed that current meteorological vertical temperature and wind velocity profiles will be utilized in the sound propagation model. However, when current meteorological data are unavailable, models that have been developed to extend limited surface temperature and wind conditions vertically may be of value. This report presents several temperature and wind profile models and suggestions for their use. (Author)

AD-A108 616/4 PC **A03**/MF **A01**
Bolt Beranek and Newman, Inc., Canoga Park, CA.
Incorporation of Environmental Impact Indices into Noisemap.
Final rept.,
Harry Seidman. Nov 81, 33p BBN-4444, AFAMRL-TR-81-31
Contract F33615-79-C-0516
See also Rept. no. AMRL-TR-78-39, AD-A061 657.

NOISEMAP and the General Purpose Contouring Program (GPCP) were modified to be compatible with the SITE II demographic data base and software program. This means that population and socio-economic status information from census tract tapes can be routinely obtained for noise contour areas generated using NOISEMAP. NOISEMAP Version 4.1 identifies to all users this new demographic overlay capability and the recent (Feb 80) update of the military aircraft noise data base (NOISEMAP) that revised the algorithm for predicting sound duration as a function of propagation distance. (Author)

AD-A108 626/3 PC **A06**/MF **A01**
Pennsylvania State Univ., University Park. Noise Control Lab.
Ray Tracing Techniques - Derivation and Application to Atmospheric Sound Propagation.
Interim rept.,
S. David Roth. Jan 80, 101p
Contract DAAK07-80-C-0001

It is commonly known that in non-homogeneous media (phase velocity dependent on location) refraction of acoustic signals occurs. Solving the wave equation with variable c is extremely involved and the cases where solutions can be found do not give very much insight into the physical meaning of the problem. The method of ray tracing, the solution of the eikonal equation, readily adapts itself to non-homogeneous media and describes the propagation of wavefronts. It has been used extensively in underwater acoustics but not so much in atmospheric applications. Some reasons for the limited use of ray tracing techniques in outdoor sound propagation are that (1) most acoustic work in recent years has been for underwater applications due to Navy sponsoring, and (2) also very few simultaneous measurements of acoustical and meteorological data have been performed. Atmospheric sound ranging techniques have in the past neglected verticle velocity gradients. Ray tracing is a useful method in studying propagation in air and can be used as an adjustment to sound ranging methods to consider atmospheric variations. Presented here is a derivation of the eikonal equation and its solution with an attempt to give physical reasons for this approach. A computer model of the technique of ray tracing for atmospheric applications (also an eigenray model) has been developed and some results are given using data collected in field measurements. (Author)

AD-A108 709/7 PC **A02**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA. Marine Physical Lab.
Sources of Acoustic Backscattering at 87.5 kHz.
Summary rept.,
Paul Greenblatt. Jul 81, 13p Rept no. MPL-U-77/80
Contract N00014-75-C-0704
Pub. in Jnl. of the Acoustical Society of America, v70 n1 p134-142 Jul 81.

No abstract available.

AD-A108 755/0 PC **A03**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
FRAM II Single Channel Ambient Noise Statistics: A Paper Presented at the 101st Meeting of the Acoustical Society of America, 19 May 1981, Ottawa, Canada.
Technical document,
Roger F. Dwyer. 25 Nov 81, 34p Rept no. NUSC/TD-6583

This document describes the results of a statistical analysis study of FRAM II arctic under-ice ambient noise data. The specific data that were analyzed were recorded on 23-24 April 1980 from a pack ice camp in the Arctic Ocean, located at 86 deg N latitude, 25 deg W longitude. At this location, the bottom depth was approximately 4000 m. The measurement system consisted of a broadband omnidirectional hydrophone, suspended to a depth of 91 m from a sonobuoy located in a lead. Under the influence of arctic currents, the pack ice was slowly moving. This movement caused rifting and cracking of ice, which occurred, at times, throughout the experiments and represented a structured acoustic noise source. Both impulsive and burst noise were identified in the data and were probably created by tensile cracks and rubbing ice masses.

N82-13828/0 PC **A02**/MF **A01**
Old Dominion Univ., Norfolk, VA. Dept. of Physics.
Propagation of Sound Through the Earth's Atmosphere.
Progress Report, 1 Jan. - 30 Jun. 1981.
R. Meredith, F. Badavi, and J. Becher. Aug 81, 12p NASA-CR-165008, PTR-81-12
Contract NAG1-142

No abstract available.

20B. Crystallography

AD-A108 219/7 PC **A02**/MF **A01**
Wisconsin Univ.-Madison.
LEED Investigation of Extended Defects at the Surface of Ge Films Grown Epitaxially on GaAs(110).
Technical rept.,
H. M. Clearfield, D. G. Welkie, T.-M. Lu, and M. G. Lagally. 30 Mar 81, 10p Rept no. TR-8
Contract N00014-77-C-0474
Pub. in Jnl. of Vacuum Science Technology, v19 n3 p323-330 Sep/Oct 81.

No abstract available.

AD-A108 632/1 PC **A03**/MF **A01**
CERES Corp., Waltham, MA.
Growth of High Purity Oxygen-Free Silicon by Cold Crucible Techniques.
Interim rept. 18 May 80-30 May 81,
Joseph F. Wenckus, and Wilson P. Menashi. Oct 81, 49p RADC-TR-81-280
Contract F19628-80-C-0104

This work includes a detailed evaluation of previous research on cold crucible technology, the design and construction of a cold crucible assembly and the investigation of the growth of single crystals of high purity silicon using the water-cooled cold crucible. In parallel with the experimental work, a theoretical analysis is being carried out on the thermodynamics and heat flow characteristics within the melt confined in the cold crucible in an effort to develop a better understanding of the crystal growth process. Results to date have been encouraging. A water-cooled copper cold crucible (73 mm I.D.) which incorporates a bottom-feeding mechanism, has been designed, constructed and tested. Silicon melts (weighing 750 grams) can be routinely melted using low frequency induction heating (approx. 250-300 Khz) and confined within the cold crucible for extended periods without contamination. Seeding techniques have been developed to permit the Cz growth of single crystals of silicon with lengths up to 100 mm and diameters in excess of 25 mm. The preliminary characterization data on the single crystals produced are inconclusive. However, it appears that the purity levels (including oxygen content) of single crystals produced to date are equal to or in most cases, better than, the purity level of the polycrystalline feed material.

AD-A108 665/1 Not available NTIS
Stanford Univ., CA. Stanford Electronics Labs.
Models of Column III and V Elements on GaAs (110): Application to MBE,
Perry Skeath, I. Lindau, C. Y. Su, and W. E. Spicer. 21 May 81, 5p
Contracts N00014-75-C-0289, N00014-79-C-0072
Availability: Pub. in Jnl. of Vacuum Science and Technology, v19 n3 p556-560 Sep/Oct 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A108 750/1 PC **A03**/MF **A01**
Rockwell International, Thousand Oaks, CA. Science Center.
Growth of HgCdTe by Modified Molecular Beam Epitaxy.
Semi-annual technical rept.no. 4, 1 Mar-31 Aug 81, J. T. Cheung. Sep 81, 43p Rept no. SC5202.14SA
Contract MDA903-79-C-0188, DARPA Order-3704

Thick Hg sub 1-x Cd sub x Te films (> 5 micron were deposited on CdTe sub x (111) A and other substrates by evaporating either (HgTe) sub 1 - x/(CdTe) sub x mixture or Hg sub 1-x Cd sub x Te crystals with a pulsed laser. The films were single phase and stoichiometric. All films showed preferential (111) texture. Electrical properties were characterized by Hall measurements, for a x = 0.3 film after annealing, typical values of carrier concentration and mobility were 1-2 x ten to the 17th power/ccm and 3500-6000 sq cm/Vsec, respectively.

20C. Electricity and Magnetism

AD-A108 504/2 PC **A02**/MF **A01**
Mission Research Corp., Albuquerque, NM.
Beam Propagation Experimental Study.
Interim rept.
Carl Ekdahl. 8 Apr 81, 24p AMRC-N-167, AFOSR-TR-81-0739
Contract F49620-81-C-0016

The pressure regime for stable propagation of an intense relativistic electron beam (I > 20 kA, W > 1.5 MeV, t > 20 ns) was determined and the beam-current density distribution was measured using an array of fast-response, subminiature Faraday cups. Experiments were performed on the stabilization of this preequilibrated beam when it was extracted into full-density air. (Author)

AD-A108 726/1 PC **A02**/MF **A01**
Air Force Weapons Lab., Kirtland AFB, NM.
Propagation of a Relativistic Charged Particle Beam through an Air Medium with Conducting Boundaries.
Final rept.,
R. W. Lemke, and K. A. Dreyer. May 80, 15p Rept no. AFWL-TR-79-198

Many propagation experiments involve firing a relativistic charged particle beam into a column of air bounded by the conducting walls of a drift tube. In this investigation, the extent to which the magnitude of the resulting return current and, hence, the stability of the propagating beam is affected by the presence of conducting boundaries. Maxwell's equations are employed to derive the appropriate wave equation. This equation is transformed into a diffusion equation which is numerically solved for various boundary parameters. (Authors)

AD-A108 739/4 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Standard Test Case Runs for the EMPULSE Monopole Fieldsolver and Conductivity Generation Model,
Frank W. Chambers, and David M. Cox. 2 Mar 81, 60p Rept no. UCID-19213
Contract W-7405-ENG-48, ARPA Order-3178

At the high current beam propagation workshop it was realized that fieldsolver comparisons between working groups should be made for beams with expanded heads such as develop by blowoff and erosion during propagation. To facilitate comparisons of the fieldsolvers while removing the differences due to evolution of the beam during propagation, standard test cases with imposed beam head profiles were suggested. Hence, unambiguous field and conductivity generation calculation comparisons can be made. The field equations solved for this report are derived elsewhere. The plasma generation model includes a direct deposition term, an avalanche ionization term based on experimental data, and a recombination term. Plasma density is related to a scalar conductivity through the momentum transfer collision frequency. The actual coded fieldsolver used for the results in this report was extracted from the EMPULSE II code. The PHOENIX code was constructed to run this fieldsolver and generate the appropriate diagnostic output. Standard test cases are proposed where the beam current density is prescribed at all points in space. This is accomplished using a simple parameterized profile which can represent a cylindrical beam or one with an eroded nose. Four test cases are proposed; PHOENIX results for these cases are presented.

SAND-80-1546 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Pulsed Magnetic Field Distribution Near Conducting Rings.
E. L. Patterson, and J. R. Freeman. Jul 80, 26p
Contract AC04-76DP00789

Measurements and calculations of the magnetic field distribution in the vicinity of stainless steel rings immersed in a pulsed magnetic field are compared. The computer code TRIDIF is found to produce results in good agreement with the measurements. The perturbations in magnetic field due to the rings are found to be considerably less than one would expect from one-dimensional skin depth considerations. (ERA citation 05:034426)

20D. Fluid Mechanics

AD-A108 208/0 PC **A04**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Acta Mechanica Sinica (Selected Articles).
12 Nov 81, 73p Rept no. FTD-ID(RS)T-0708-81
Edited trans. of Acta Mechanica Sinica (China) n1 p18-28, 38-47, 84-99 1980.

No abstract available.

AD-A108 211/4 PC **A02**/MF **A01**
Science Applications, Inc., McLean, VA.
Spectral Model Predictions of Mean-Square-Shear Distortion Rates.
Technical rept. 20 Nov 80-7 May 81,
Walt Grabowski, and Fred C. Newman. 7 May 81, 23p Rept no. SAI-82-485-WA
Contracts N00014-81-C-0084, N00014-81-C-0075

It is possible to use a simple shear spectral model to produce some estimates of the mean-square velocity difference over given values of delta z. The distortion of a fluid region (a wake cross section, say) of dimension L is clearly due to velocity differences over delta z equal to L and smaller. In this note we explore the behavior of velocity differences over delta z with a simple model for the shear spectral density function. (Author)

AD-A108 305/4 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor.
Similarity Solutions for Turbulent Jets and Plumes.
Technical rept. 1 Jan 80-31 Dec 81,
Chia-Shun Yih. 1 Nov 81, 26p
Contract N00014-77-C-0267
Pub. in Jnl. of the Engineering Mechanics Div., ASCE, v107 nEM3 p455-478 Jun 81.

No abstract available.

AD-A108 306/2 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor.
Similarity of Steady Stratified Flows.
Technical rept. 1 Jan 80-31 Dec 81,
Chia-Shun Yih. 30 Apr 80, 7p
Contract N00014-77-C-0267
Pub. in Jnl. of Fluid Mechanics, v108 p241-246 1981.

No abstract available.

AD-A108 307/0 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor.
Flows with Condensation.
Technical rept. 1 Jan 80-31 Dec 81,
Chia-Shun Yih. 26 Feb 79, 10p
Contract N00014-77-C-0267
Pub. in Quarterly of Applied Mathematics, v37 p401-409 Jan 80.

No abstract available.

AD-A108 334/4 PC **A03**/MF **A01**
Houston Univ., TX. Dept. of Mechanical Engineering.
Search for Large-Scale Coherent Structures in the Nearly Self-Preserving Region of a Turbulent Axisymmetric Jet.
Final rept. 1 Sep 79-31 Aug 80,
A. K. M. F. Hussain. Mar 81, 32p AFOSR-TR-81-0760
Contract F49620-79-C-0227

In an attempt to explore the existence of large-scale coherent structures in the self-preserving region of an axisymmetric free air jet, a 2.54 cm air jet at a Reynolds number of 46,000 has been investigated for distances in excess of 40 diameters using both long and short time-averaged space-time correlation measurements. Conventional space-time correlation data with probe separations in the streamwise direction by as much as 25 diameters suggest the existence of large-scale coherent structures centered off the jet axis. The radial extent of these structures is about one local jet diameter, and the azimuthal extent is about a quadrant of the cross-section. Time series of short time-averaged correlations between longitudinal velocity fluctuations obtained with two arrays of hot-wires separated in the streamwise direction strongly support the existence of these structures. Nearly periodic peaks and valleys were intermittently observed. A qualitative picture of the spatial characteristics of these structures was inferred from the short time-averaged cross correlation of these time series with a sinusoidal model function. Traces of instantaneous transverse velocity and Reynolds stress as well as the instantaneous velocity vector patterns obtained from a radial array of X-wires also depict existence of large-scale organized motions. (Author)

AD-A108 367/4 PC **A08**/MF **A01**
Tel-Aviv Univ. (Israel). Dept. of Fluid Mechanics and Heat Transfer.
On the Relationship between Transitional and Fully Turbulent Shear Flow.
Annual rept. 1 Mar 80-31 Mar 81,
I. Wygnanski. 31 May 81, 169p AFOSR-TR-81-0764
Grant AFOSR-77-3275

Pulsating flow of air in a straight smooth pipe was investigated experimentally. The period of forcing ranged from 0.5 sec to 5 sec which resulted in the change in the non-dimensional frequency parameter alpha = r sq root of w/nu of 4.5 to 15. The introduction of periodic surging had no effect on the time mean quantities. The present data was compared in detail with the theory of Uchida (1956) in the laminar flow regime. The time dependent components at the forcing frequency were presented by the radial distribution of amplitude and phase. An integral momentum equation in a time dependent flow requires a force triangle to be maintained at any instant. The triad of forces are: pressure, inertia and shear. All terms of the force balance equation were measured independently providing a good check of data. The measured turbulent characteristics of the flow, including the RMS values of the velocity fluctuations, Reynolds stress and short-time power spectra are dependent on the phase of the forced oscillations. The radial distribution of the phase angle of velocity is qualitatively different in laminar and turbulent flows. In order to explain this difference the concept of a relaxation time of the turbulent flow was employed. Transitional flow in a boundary layer is also briefly discussed. (Author)

AD-A108 410/2 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor.
Round Buoyant Laminar and Turbulent Plumes.
Technical rept. 1 Jan 80-31 Dec 81,
Chia-Shun Yih, and Feng Wu. 21 Aug 80, 10p
Contract N00014-77-C-0267
Pub. in the Physics of Fluids, v24 n5 p794-801 May 81.

No abstract available.

AD-A108 413/6 Not available NTIS
California Univ., Berkeley.
Estimates of Intermittency, Spectra, and Blow-Up in Developed Turbulence,
Alexandre Joel Chorin. Mar 81, 14p

Contracts N00014-76-C-0316, W-7405-ENG-47
Availability: Pub. in Communications on Pure and Applied Mathematics, v34, p853-866 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A108 438/3 PC **A02**/MF **A01**
Howard Univ., Washington, DC. Dept. of Mathematics.
A Model Spectral Problem for the Linear Stability of Nearly Parallel Flows,
Isom H. Herron. 1981, 10p
Contract N00014-80-C-0613
Pub. in Mathematics Studies, v55 Spectral Theory of Differential Operators, p211-217 1981. Proceedings of the Conference Held in Birmingham, AL 26-28 Mar 81.

No abstract available.

AD-A108 439/1 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor.
Interplay and Competition of Forces in Stratified Flows,
Chia-Shun Yih. 1980, 24p
Contract N00014-77-C-0267
Pub. in International Symposium on Stratified Flows (2nd), Trondheim, Norway, 24-27 Jun 80.

No abstract available.

AD-A108 498/7 PC **A03**/MF **A01**
New York Univ., Westbury. Dept. of Applied Science.
The Investigation of the Propagation Mechanism of Pressure Fluctuation in Turbulent Flow.
Final rept.,
Victor Zakkay, and Vincent Barra. Feb 81, 39p NYU/DAS-81-23, AFOSR-TR-81-0759
Grant AFOSR-79-0128

A one foot induction wind tunnel was built for the purpose of studying the coherent structure of turbulence. Simultaneous measurements of velocity, wall pressure and wall-shear fluctuations were made on the wall of a one foot pipe in a range of velocities from 30 to 700 ft/sec. The results presented here were obtained for flow conditions which differ significantly from those in previous studies. For the majority of the tests, the free stream velocity is in the high subsonic regime, and the Reynolds number is an order of magnitude higher than that for which the coherent structure has previously been investigated. The measurements were made on the wall of an axially symmetric one foot test section in order to insure true two-dimensionality of the flow.

AD-A108 507/5 PC **A04**/MF **A01**
Rhode Island Univ., Kingston.
Stability Analysis of the Compressible, Adiabatic, Similar Boundary Layer Equations (Lower Branch).
Final rept. 1 May 80-30 Apr 81,
G. R. Verma, S. J. Scherr, and W. L. Hankey. May 81, 53p AFOSR-TR-81-0782
Grant AFOSR-80-0150

In a previous report, the authors analyzed the stability of the lower branch solutions of the incompressible (M sub infinity = 0) Falkner-Skan boundary layers. This report extends this work by including the effect of Mach number M sub infinity on the stability of adiabatic case. (Author)

AD-A108 553/9 PC **A07**/MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
Pseudo-Stationary Oblique Shock-Wave Reflection in Carbon Dioxide - Domains and Boundaries.
Interim rept.,
Samon Ando. Apr 81, 138p UTIAS-TN-231, AFOSR-TR-81-0807
Grant AFOSR-77-3303

Transition boundaries for a triatomic gas between various types of shock-wave reflection configurations--regular reflection (RR), single Mach reflection (SMR), complex Mach reflection (CMR), and double Mach reflection (DMR)--exhibited by a plane shock impinging on a compressive corner in a shock tube were studied experimentally using CO2 as the test gas. The shock Mach numbers ranged from 1.8 to 10.2, and the initial pressure from 3.5 to 80 torr at room temperature. The regions corresponding to the four types of reflection were obtained in terms of the shock Mach number, Ms, and the wedge angle, theta sub w. The resultant transition map in the Ms - theta sub w plane will be of value to future researchers in the field as an aid in designing their experiments. Excellent agreement was obtained between the transition boundary from CMR to DMR according to the criterion proposed by Ben-Dor & Glass that the flow downstream of the reflected shock should be sonic relative to the kink of the reflected shock for the transition to occur and the results of the present experiments. This fact will further confirm the validity of their criterion. The density contours of the flow fields were obtained by means of infinite-fringe interferograms, some of which, particularly those of CMR and DMR, were hitherto unavailable in the literature. They may prove valuable for comparison with the results of numerical simulation of the phenomena, which is currently the subject of intense research at various institutions.

N82-13151/7 PC **A05**/MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
On a Dusty-Gas Shock Tube.
H. Miura, and I. I. Glass. May 81, 80p UTIAS-250, CN-ISSN-0082-5255
Contract AF-AFOSR-3303-77
Sponsored in Part by Natural Sciences and Engineering Research Council of Canada, U.S. Army, and Defence Research Establishment, Suffield.

Analytical and numerical methods were used to investigate the flow induced by a shock wave in a shock-tube channel containing air laden with suspended small solid particles. Exact results are given for the frozen and equilibrium shock wave properties as a function of diaphragm-pressure ratio and shock-wave Mach numbers. The driver contained air at high pressure. A modified random-choice method together with an operator-splitting technique show the decay of a discontinuous frozen shock wave, a contact discontinuity, formation of a stationary shock structure, and an effective contact front of finite thickness. The effects of particle diameter, particle-number density, and diaphragm-pressure ratio on the transitional behavior of the flow are investigated in detail. The alteration of flow properties due to the presence of particles is discussed in detail and compared with classical shock-tube flows.

N82-13385/1 PC **A03**/MF **A01**
Centre National de la Recherche Scientifique, Meudon-Bellevue (France). Lab. d'Aerothermique.
Underexpanded Free Jets and Their Interaction with Adjacent Surfaces.
J. C. Lengrand, J. Allegre, and M. Riffin. 29 Jun 81, 34p LOG-J12276
Backup Document for Aiaa Synoptic Scheduled for Publication in Aiaa Journal on Jan. 1982.

Based on semiempirical considerations, simple formulas are proposed to describe the flowfield of a highly underexpanded jet exhausting from a sonic or supersonic nozzle. Correlations for density distribution and Mach disc distance include the influence of all governing parameters in the continuum regime. Regarding pressure distribution on a wall impinged by a jet, nondimensional quantities are defined that greatly reduce the number of parameters involved in the correlations. Formulas and correlations are compared with original as well as previously published experimental results. The degree of rarefaction is discussed. Results on jet-wall interaction are thought to be of practical interest for the design of spacecrafts or launch vehicles.

N82-13398/4 PC **A07**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
A Solution of the Navier-Stokes Equations by a Mixed Finite Element Method.
Ph D. Thesis - Paris Univ.
M. Bredif. 1981, 135p ONERA-NT-1981-1, ISSN-0078-3781
In French; English Summary. Report Will Also Be Announced as Translation (Esa-TT-720).

The numerical treatment of steady state, two-dimensional Navier-Stokes equations in the incompressible case is studied. The approximation method retained is the 'mixed' finite element method, as regards stream function and vortex function. The improvements to this formulation are: possibility of choice of boundary conditions of various types; introduction of a finite element formulation of the stagnation pressure calculation; definition of a corrected formulation with a view to studying laminar flows in the case of large Reynolds numbers. The chosen formulation is discussed theoretically, encompassing the aspects mentioned. A solution algorithm is presented, based on a general conjugate gradient method; numerical results are presented for various cases of viscous, incompressible, laminar flows: (1) in a square cavity; (2) around a circular cylinder; and (3) around a NACA 0018 profile at zero angle of attack for Reynolds numbers up to 5000.

PB82-142993 PC **A06**/MF **A01**
Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Research Group.
Experimental Heat Transfer Coefficients for the Cooling of Oil in Horizontal Internal Forced Convective Transitional Flow,
D. G. Rogers. May 81, 119p CSIR-CENG-371, ISBN-0-7988-2144-2

The heat transfer coefficients for the cooling of a Newtonian oil were determined for the ranges 550 less than Re less than 2800 and 132 less than Pr less than 642. The Reynolds number alone proved to be an insufficient criterion for the division of transfer regimes, in line with the view of Eckert. In each of three of the transfer regimes recognized heat transfer was correlated by a Hausen-type equation. The values found for A and B were 0,0184 and 213,9 for the mixed turbulent regime, 0,0277 and 272,5 for the upper transitional regime, 0,0176 and 106,1 for the middle transitional regime. In all these regimes the Stanton number increases with Reynolds number, while in true turbulent or laminar flow it decreases. In the lower transitional regime, characterized by low wall Reynolds numbers, the Stanton number fluctuated with Reynolds number and no good correlation was found.

PB82-147984 PC **A11**/MF **A01**
California Inst. of Tech., Pasadena. Earthquake Engineering Research Lab.
Development of Finite Element Procedures for Fluid-Structure Interaction.
Doctoral thesis,
Wing Kam Liu. Aug 80, 235p EERL-80-06, NSF/RA-800622
Grants NSF-PFR79-00712, NSF-PFR77-23687

The development of finite element procedures for fluid-structure interaction problems is presented. The areas upon which attention is focused are: numerical transient algorithms which emphasize implicit-explicit finite element concepts; finite element kinematical descriptions for modeling fluid subdomains in fluid-structure interaction problems; finite element methodology for nearly imcompressible fluids and solids, and beam, plate and shell structures based upon theories which include transverse shear deformations; and finite rotation effects in numerical integration of rate constitutive equations arising in large-deformation analysis. All of these nonlinear methodologies have been integrated into a working finite element computer code. Numerical examples of incompressible viscous flows by the penalty function formulation are presented to demonstrate the effectiveness of the proposed formulation. A free surface wave generation problem is used to demonstrate the mixed Lagrangian Eulerian theory.

PB82-803495 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Numerical Methods in Fluid Flow Problems. August, 1979-June, 1980 (Citations from the NTIS Data Base).
Jan 82. 172p

Numerical techniques cited in this report for analysis of fluid flow problems include finite difference theory, finite element analysis, and numerical integration of differential equations including the Navier Stokes equations. Areas studies include boundary layer, hypersonic, supersonic, transonic regimes, atmosphere entry, heat transfer, blunt and concave bodies, gas dynamics, nozzle gas flow, turbomachinery, and hydrodynamics. (This updated bibliography contains 164 citations, none of which are new entries to the previous edition.)

PB82-803503 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Numerical Methods in Fluid Flow Problems. July, 1980-November, 1981 (Citations from the NTIS Data Base).
Jan 82. 285p
Supersedes PB80-814189, and NTIS/PS-79/0852.

Numerical techniques cited in this report for analysis of fluid flow problems include finite difference theory,

finite element analysis, and numerical integration of differential equations including the Navier Stokes equations. Areas studies include boundary layer, hypersonic, supersonic, transonic regimes, atmosphere entry, heat transfer, blunt and concave bodies, gas dynamics, nozzle gas flow, turbomachinery, and hydrodynamics. (This updated bibliography contains 279 citations, all of which are new entries to the previous edition.)

20E. Masers and Lasers

AD-A108 132/2 PC **A05**/MF **A01**
Mathematical Sciences Northwest, Inc., Bellevue, WA.
Investigation of a 460 nm XeF Laser.
Final rept.,
C. H. Fisher. Jun 81, 86p Rept no. MSNW-1136
Contract N00014-78-C-0343

The rare gas halide lasers have been extensively developed into efficient, high energy lasers operating in the near ultraviolet region of the spectrum. Until recently, most of the development in XeF had concentrated on the B>X transition at 350 micrometers. There is an even longer wavelength transition in XeF, the C-A continuum band at 460 micrometers. This transition has had several advantages over the shorter wavelength transitions in existing XeF and KrF lasers, including tunability and optimum atmospheric and aquatic transmission. The purpose of this program was to demonstrate lasing on the C-A transition of XeF and to gather the kinetic data necessary to optimize the laser performance. (Author)

AD-A108 173/6 PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Laser Journal (Selected Articles),
Zheng Chengen, Shangguan Cheng, Yuan Cailai, and Ye Chao Dou Airong. 6 Nov 81, 30p Rept no. FTD-ID(RS)T-0861-81
Edited trans. of Laser Journal (China) v8 n2 p5-9, 17-20, 47-49, 56-57, 1981.

No abstract available.

AD-A108 358/3 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Formulation of Normalized Non-Linear Free Electron Laser Equations.
Memorandum rept.,
C. M. Tang, and P. Sprangle. 9 Dec 81, 43p Rept no. NRL-MR-4670
ARPA Order-3817

The general non-linear self-consistent equations describing the Free electron laser (FEL) in the steady state amplifying configuration is derived with the space charge effects and all the efficiency enhancement schemes: (1) a spatially varying wiggler amplitude and/or period and (2) a D.C. electric field E sub DC (z) = (-(del phi sub DC)/del z)e-carat sub z. All the efficiency enhancement schemes are shown to be somewhat equivalent. For a variable period magnetic wiggler, the FEL equations can be appropriately normalized to a three parameter set of coupled equations. All operating regimes are covered by these normalized equations. The condition for space charge to be unimportant is given. In the absence of the space charge effects, the three parameter set of equations reduces to a two parameter set. The inclusion of additional efficiency enhancement schemes increases the number of parameters to describe the FEL. Curves showing the efficiency, radiation amplitude and growth rate will be presented. (Author)

AD-A108 374/0 PC **A03**/MF **A01**
Stanford Univ., CA. Edward L. Gi zton Lab. of Physics.
Laser Physics and Laser Spectroscopy.
Final technical rept. Jan 80-Feb 81,
R. L. Byer. Jul 81, 41p GL-3298, AFOSR-TR-81-0761
Grant AFOSR-80-0144

During this past year we have studied and published papers in the areas of: (1) Stimulated Raman Frequency Conversion; (2) Single Frequency Nd:YAG by Injection Locking; (3) Transient Injection Locking; and (4) Improved Resonator Design Using the Radial Birefringent Element.

AD-A108 503/4 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Electrical Engineering.
Investigation of Cold Cathodes for Long Life CO2 Waveguide Lasers.
Final rept. 1 May 79-30 Sep 81,
U. Hochuli. Nov 81, 18p AFOSR-TR-81-0777
Contract F49620-79-C-0096

Within a years time we have extended the life of the 1.5W CO2 waveguide laser from 1500 hours to over 8000 hours. After this period we still find some loose, sputtered cathode material in the laser. This situation can not be tolerated for lasers used in the field. Discharge tube observations indicate that other cathode materials exist that seem to produce sputtering products with better wall adhesion properties. (Author)

AD-A108 588/5 PC **A05**/MF **A01**
Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
Study of Laser Created Metal Vapour Plasmas.
Annual technical rept. 1 Oct 80-30 Sep 81,
R. M. Measures. Sep 81, 87p AFOSR-TR-81-0789
Grant AFOSR-80-0057

Laser resonance saturation represents a powerful new form of interaction that can lead at high densities to extremely rapid and efficient coupling of laser energy into both gases and plasmas. We have developed both a comprehensive experimental facility and a theoretical program for studying these interactions in alkali-vapours. Preliminary calculations have suggested that laser resonance saturation could lead to extensive ground level burnout of certain kinds of atoms or ions and that this could lead to the creation of a ground level inversion in these species. We believe that this approach could lead to the development of short wavelength lasers of high quantum efficiency. (Author)

AD-A108 628/9 PC **A02**/MF **A01**
Sigma Tau Standards Corp., Tuscaloosa, AL.
Light-Weight Hydrogen Maser.
Interim rept. 1 Oct 80-30 Jun 81,
Harry E. Peters. Oct 81, 14p 102-3, RADC-TR-81-270
Contract F19628-79-C-0104

Based upon a new approach to cavity resonator design, an atomic hydrogen maser frequency standard is being developed which is smaller and lighter by a factor of eight from previous hydrogen maser designs, but exhibits improved performance over other types of atomic standard. An operational prototype device is presently in the final assembly stage. (Author)

AD-A108 658/6 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Physics and Astronomy.
Competition Effects in Lasers.
Final rept. 1 Oct 80-30 Sep 81,
L. Mandel. Nov 81, 11p AFOSR-TR-81-0804
Grant AFOSR-81-0026

This Final Report describes research. The first two-time photoelectric correlation measurements of a ring laser were completed during this period, which demonstrated the effect of mode competition in modifying the characteristics of a laser. Theoretical quantum treatments of a two-mode ring laser, and of a laser with coupled transitions were completed, and phase transition effects in a laser exhibiting optical bistability, and one with a saturable absorber, were investigated. The research resulted in four publications in the scientific literature, and 11 lectures describing various aspects of the research were presented at scientific meetings and research seminars. These are all listed in the Report.

AD-A108 692/5 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Electrical Engineering.
Investigation of Cold Cathodes for Long Life CO2 Waveguide Lasers.
Annual summary rept.,
U. Hochuli. Nov 81, 17p
Contract N00014-79-C-0312
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Within a year's time we have extended the life of the 1.5W CO2 waveguide laser from 1500 hours to over 8000 hours. After this period we still find some loose, sputtered cathode material in the laser. This situation can not be tolerated for lasers used in the field. Discharge tube observations indicate that other cathode materials exist that seem to produce sputtering products with better wall adhesion properties. (Author)

PAT-APPL-6-092 801 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Free Electron Laser Employing an Expanded Hollow Intense Electron Beam and Periodic Radial Magnetic Field.
Patent Application,
S. P. Schlesinger. Filed 9 Nov 79, 15p AD-D009 035/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The generation of very high power pulses of coherent electromagnetic radiation that are continuously tunable in frequency is accomplished by means of a free electron laser in which a hollow relativistic electron beam is projected along the longitudinal axis of an evacuated drift tube. A first magnetic field expands the electron beam into an annular peripheral interaction region of the drift tube where the beam interacts with a second periodic radial magnetic field. Frequency is varied by changing the electron velocity of the electron beam or by changing the periodicity of the radial magnetic field. The device can be made to operate as an oscillator by the inclusion of resonant cavity defining mirrors within the interaction region, or as an amplifier by injecting a coherent radiation signal into the interaction region. Both oscillator and amplifier functions can be incorporated into a single device. Linewidth is narrowed by utilizing a Smith-Fox interferometer to couple the generated coherent radiation into an output light pipe.

PAT-APPL-6-300 763 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Self-Supporting Laser Diffuser Flow Energizer.
Patent Application,
Siegfried H. Hasinger. Filed 10 Sep 81, 16p AD-D009 042/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A self-supporting laser diffuser flow energizer is described for improving the performance of radial flow lasers by providing novel means for pressure recovery, and comprises a self-sustaining suction means communication with the laser cavity for changing the supersonic shock front configuration existing within a radial laser diffuser and thereby promoting the flow of gaseous laser medium within the laser cavity. (Author)

PB82-860677 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Neodymium YAG Lasers. 1975-January, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 82.
Jan 82, 220p

The properties and applications of neodymium- yttrium-aluminum-garnet lasers are discussed. Applications include welding of parts such as printed circuits, medical applications, telecommunication systems, and optical pumping for high powered lasers. (Contains 199 citations fully indexed and includes a title list.)

UCID-18882 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Novette Chain Design and Performance.
J. T. Hunt, and D. R. Speck. 11 Dec 80, 36p
Contract W-7405-ENG-48

The design and performance of the Novette laser system, which is a two-beam, two-wavelength (1.05 mu and 0.53 mu) target irradiation facility using phosphate glass laser chains, are discussed with information on the glass properties, controlling factors in the design selection, and projected performance with varying operating conditions. (ERA citation 06:008065)

20F. Optics

AD-A108 278/3 PC **A04**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
NITINOL Interconnect Device for Optical Fiber Waveguides.
Final rept.,
David Goldstein, and John Tydings. 1 Jul 81, 71p
NSWC/TR-81-129, NAVSEA-S562-78

Two different interconnect devices for optical fibers have been developed. Each uses the shape memory effect alloy 'NITINOL'. The simpler of the two is of tubular design and accommodates fibers as small as 200 micron diameter. The more complex multi-component design accommodates 125 micron diameter fibers. The complex design is simpler to use, easier to manufacture and lower in cost. It permits less than 1 db loss and is re-matable. A description of NITINOL manufacture is given. (Author)

N82-13892/6 PC **A11**/MF **A01**
Ecole Nationale Superieure des Telecommunications, Paris (France).
Experimental Study of Heterodyne Photodetection. Perspectives for Applications to Optical Transmission Etude Experimentale de la Photodetection Heterodyne. Perspectives d'Applications aux Transmissions Optiques.
Ph.D. Thesis.
M. Attia. Dec 80, 247p ENST-E-80013
In French; English Summary.

Heterodyne photodetection in the visible and near infrared spectral ranges was studied. The physical principles underlying the operation of the different components used to establish optical links are recalled. Performance and limitations of incoherent photodetection are then reviewed. A classical electromagnetic representation of heterodyne detection is presented, illustrating advantages and difficulties of application. After a justification of component choices, the experimental setup is described, and results are discussed. The outlook for utilization of heterodyne photodetection in a monomode fiber transmission system is indicated.

PAT-APPL-6-231 074 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Holographic Reflective Grating Multiplexer/Demultiplexer.
Patent Application,
J. E. Ludman. Filed 3 Feb 81, 21p AD-D009 036/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A multiplexer/demultiplexer has a holographically formed reflective grating incorporated therein. In operation as a demultiplexer, a single signal having a plurality of wavelengths impinges upon the holographic reflective grating in an appropriate manner and is separated into a plurality of signals, each being of a different one of the wavelengths. In athe multiplexing mode of operation, a plurality of signals, each being of a different wavelength impinges upon the holographic reflective grating in an appropriate manner and emerges therefrom as a single signal having all of the different wavelengths.

PB82-145194 PC **A03**/MF **A01**
Sentralinstitutt for Industriell Forskning, Oslo (Norway).
Encircled Energy for Aberration-Free, Large F-Number Systems with Centrally Obscured Circular Pupils,
J. Stamnes, H. Heier, and S. Ljunggren. 11 Dec 80, 39p 780144, !SBN-82-7267-273-1

The encircled energy is computed for large f-number, aberration free, annular aperture systems with linear obscuration ratios between 0.0 and 0.9. The computations are based on an algorithm due to Hopkins. The results are displayed graphically as contour lines showing the fraction of the total energy which falls within small circles centered on the optical axis in selected receiving planes parallel to the geometrical focal plane.

PB82-145616 PC **A04**/MF **A01**
Federal Highway Administration, Washington, DC. Traffic Systems Div.
Fiber Optics Technological Review and Assessment for Traffic Control.
Final rept. Oct 79-Aug 81,
Warren F. Dorsey. Sep 81, 65p FHWA/RD-81/1€0

This report provides a review and assessment of fiber optics technology. The key areas of discussion include fiber optics basic principles, components, design considerations, and applications. The report also attempts to identify and forecast the future developmental areas of this technology. The sixth chapter of the report concentrates on a systems level assessment of the fiber optics technology for traffic control.

20G. Particle Accelerators

AD-A108 353/4 PC **A02**/MF **A01**
Office of Naval Research, London (England).
4th International Topical Conference on High-Power Electron and Ion-Beam Research and Technology, held in Palaiseau, France, 29 June - 3 July 1981.
Conference rept.,
John R. Neighbours. 9 Oct 81, 16p Rept no. ONRL-C-6-81

The Fourth International Topical Conference on High-Power Electron and Ion-Beam Research and Technology program included electron and ion beam generators, beam transport plasma heating and free electron lasers. This report is principally about foreign research results. It also contains a list of speakers and the topics discussed.

AD-A108 359/1 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Dynamics of an Intense Electron Ring in a Modified Betatron Field.
Memorandum rept.,
P. Sprangle, C. A. Kapetanakos, and S. J. Marsh. 23 Nov 81, 28p Rept no. NRL-MR-4666

The dynamics of an intense electron ring confined in a modified betatron magnetic field is considered. The analysis assumes that the electron ring is located near the center of a conducting torus and includes self fields, induced fields from the walls surrounding the ring and toroidal effects. It has been found that the geometric center of the ring can perform circular motion around the minor axis of the torus. Based on this analysis, a scheme is proposed for the injection of an intense electron beam into a modified betatron accelerator. (Author)

LA-8456-PR PC **A09**/MF **A01**
Los Alamos Scientific Lab., NM.
Progress at LAMPF: Clinton P. Anderson Meson Physics Facility. Progress Report, January-June 1980.
J. C. Allred. Sep 80, 197p
Contract W-7405-ENG-36

The bulk of this semiannual progress report of the LASL MP Division is concerned with brief reports of physics research. Other sections deal with facility and experimental developments, accelerator operations, experiments run, new proposals, meetings, and LAMPF news. Twenty reports containing data are abstracted and indexed individually. (ERA citation 06:006419)

LA-8658-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Accelerator Drift-Tube Braze-Joint Failures in the PIGMI APF Cavity.
L. D. Hansborough, L. S. Levinson, R. D. Reiswig, and L. C. Wilkerson. Jan 81, 21p
Contract W-7405-ENG-36

During the assembly of the Alternating Phase Focusing cavity for the PIGMI Prototype proton accelerator, recurring failures of drift-tube braze joints occurred. In the fabrication technique, a torch braze was used to attach the stems to both the drift-tube body and the stem termination; all materials used were stainless steel. The assemblies were copper plated, using bright-acid-leveling copper plating. Some braze joints, although satisfactorily tension-tested before plating, later failed at a relatively low loading. A detailed investigation of one drift tube indicated that residual copper-plating solution in the cooling passages acted to dissolve the braze solution over a period of weeks, leading to an eventual joint failure. (ERA citation 06:009549)

PATENT-4 293 794 Not available NTIS
Department of the Navy, Washington, DC.
Generation of Intense, High-Energy Ion Pulses by Magnetic Compression of Ion Rings.
Patent,
Christos A. Kapetanakos. Filed 1 Apr 80, patented 6 Oct 81, 7p AD-D009 026/6, PAT-APPL-6-136 227
Supersedes PAT-APPL-6-136 227, AD-D007 149.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a system based on the magnetic compression of ion rings, for generating intense (high-current), high-energy ion pulses that are guided to a target without a metallic wall or an applied external magnetic field includes a vacuum chamber; an inverse reflex tetrode for producing a hollow ion beam within the chamber; magnetic coils for producing a magnetic field, Bo, along the axis of the chamber; a disc that sharpens a magnetic cusp for providing a rotational velocity to the beam and causing the beam to rotate; first and second gate coils for producing fast-rising magnetic field gates, the gates being spaced apart, each gate modifying a corresponding magnetic mirror peak (near and far peaks) for trapping or extracting the ions from the magnetic mirror. The ions form a ring or layer having rotational energy. Also included are a metal linear for generating by magnetic flux compression a high, time-varying magnetic field, the time-varying magnetic field progressively increasing the kinetic energy of the ions, the magnetic field from the second gate coil decreasing the far mirror peak at the end of the compression for extracting the trapped rotating ions from the confining mirror; and a disc that sharpens a magnetic half-cusp for increasing the translational velocity of the ion beam. The system utilizes the self-magnetic field of the rotating, propagating ion beam to prevent the beam from expanding radially upon extraction.

RL-79-024 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Ferrite Measurements for SNS Accelerating Cavities.
R. G. Bendall, and R. A. Church. Mar 79, 16p
U.S. Sales Only.

The RF system for the SNS has six double accelerating cavities each containing seventy ferrite toroids. Difficulties experienced in obtaining toroids to the required specifications are discussed and the two toroid test cavity built to test those supplied is described. Ferrite measurements are reported which were undertaken to measure (a) mu Qf as a function of frequency and RF field level and (b) bias current as a function of frequency for different ranges of ferrite permeability mu . (Atomindex citation 10:473674)

RL-79-030 PC **A03**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Design of a Bio-Medical Negative pi-Meson Line at the Spallation Neutron Source at the Rutherford Laboratory.
J. Butterworth, and D. H. Reading. Apr 79, 43p
U.S. Sales Only.

A design of a bio-medical beam line is presented which accepts negative pi-mesons from a transmission target in the 800 MeV extracted proton beam of the Spallation Neutron Source being constructed at the Rutherford Laboratory. Though the distribution needs refining it is shown that a pion dose of 10 rad/min may be produced over an irradiated 'peak region' of 8 x 12 cm exp 2 x 7 cm depth at useful depths, with a lower entrance dose. This has the required characteristics for major scientific experiments and is at the lower end of the range quoted for dose rates necessary for eventual radiotherapy using pions. (Atomindex citation 10:473676)

SLAC-PUB-2522 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Review of Accelerator Instrumentation.
J. L. Pellegrin. May 80, 12p CONF-800740-11
Contract AC03-76SF00515
11. international conference on high energy accelerators, Geneva, Switzerland, 7 Jul 1980.

Some of the problems associated with the monitoring of accelerator beams, particularly storage rings' beams, are reviewed along with their most common solutions. The various electrode structures used for

the measurement of beam current, beam position, and the detection of the bunches' transverse oscillations, yield pulses with sub-nanosecond widths. The electronics for the processing of these short pulses involves wide band techniques and circuits usually not readily available from industry or the integrated circuit market: passive or active, successive integrations, linear gating, sample-and-hold circuits with nanosecond acquisition time, etc. This report also presents the work performed recently for monitoring the ultrashort beams of colliding linear accelerators or single-pass colliders. To minimize the beam emittance, the beam position must be measured with a high resolution, and digitized on a pulse-to-pulse basis. Experimental results obtained with the Stanford two-mile Linac single bunches are included. (ERA citation 05:032724)

SLAC-PUB-2533 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Surface Studies of Materials for Superconducting Cavities.
E. L. Garwin, R. E. Kirby, T. Momose, and E. W. Hoyt. Jun 80, 4p CONF-800928-3
Contract AC03-76SF00515
International vacuum congress/ 4. international conference on surface science and 3. European conference on solid surface, Cannes, France, 22 Sep 1980.

A multitechnique system has been constructed to study materials and processes used for producing high Q superconducting cavities, while constantly maintaining uhv environment. Characterization of a small disc of superconducting material, e.g. Nb, is done by a variety of methods, including AES, XPS, EID, ellipsometry, sputter profiling, and secondary electron yield measurements. The samples may be processed in situ by rf and electron bombardment heating, and ion sputtering. Sample temperatures may be held from 77K to 2500K. Coating by sputtering and evaporation, and oxidizing and nitriding are incorporated. Both AES and secondary yield measurements are accomplished using very low current electron beams and counting electronics to minimize the reduction of oxide surfaces by electrons. Computer-controlled ellipsometry allows monitoring of the temporal growth of surface layers during controlled exposure to gases. Extensive measurements have been carried out on Au, C, Pt, Nb and its oxides, nitride, and carbide. AES, secondary yield, and other measurements are presented, and trends which may enable the production of stable cavity surfaces and their simple, effective in situ regeneration while installed as accelerating cavity surfaces are discussed. (ERA citation 05:032725)

SLAC-PUB-2537 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Scaling of Damping Rings for Colliding Linac Beam Systems.
H. Wiedemann. Jun 80, 7p CONF-800740-10
Contract AC03-76SF00515
11. international conference on high energy accelerators, Geneva, Switzerland, 7 Jul 1980.

The scaling of damping rings for colliding linear accelerator beams is discussed. It was found that low repetition rates should be used to achieve the highest luminosity. Only for very high values of the repetition rate above 10 exp 4 sec exp -1 the luminosity is found to increase again with pulse repetition rate. In this regime, however, damping rings are not useful anymore and the operating cost for the facility is very high without gain in luminosity as compared to low repetition rates. Therefore for reasons of economics as well as performance low pulse repetition rates should be chosen and research and development should be denoted to solve tolerance problems encountered at these low pulse rates. (ERA citation 05:032718)

UCID-18633 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Suppression of Transverse Beam Breakup Modes in an Induction Accelerator by Gas Focusing.
R. J. Briggs. 7 Apr 80, 26p
Contract W-7405-ENG-48

The effect of beam-generated positive ions on the beam-breakup instability in linear electron accelerators is calculated using simple models. The strongly nonlinear dependence of the ion focusing force on radius makes a complete suppression of the mode growth possible, in contrast to solenoidal focusing. The predicted gas pressures for significant stabilization of the mode growth in a machine configuration like ATA is relatively low (10 exp -5 to 10 exp -4 torr), even for high-Q modes. (ERA citation 05:026247)

20H. Particle Physics

LBL-11085 PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Physics, Computer Science and Mathematics Division. Annual Report, 1 January-31 December 1979.
J. V. Lepore. Sep 80, 104p
Contract W-7405-ENG-48

This annual report describes the research work carried out by the Physics, Computer Science and Mathematics Division during 1979. The major research effort of the Division remained High Energy Particle Physics with emphasis on preparing for experiments to be carried out at PEP. The largest effort in this field was for development and construction of the Time Projection Chamber, a powerful new particle detector. This work took a large fraction of the effort of the physics staff of the Division together with the equivalent of more than a hundred staff members in the Engineering Departments and shops. Research in the Computer Science and Mathematics Department of the Division (CSAM) has been rapidly expanding during the last few years. Cross fertilization of ideas and talents resulting from the diversity of effort in the Physics, Computer Science and Mathematics Division contributed to the software design for the Time Projection Chamber, made by the Computer Science and Applied Mathematics Department. (ERA citation 06:006700)

N82-13851/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Adaptation of the TH Epsilon mu Formalism for the Analysis of the Equivalence Principle in the Presence of the Weak and Electroweak Interaction.
A. J. Fennelly. Oct 81, 40p NASA-TM-82450

The TH epsilon mu formalism, used in analyzing equivalence principle experiments of metric and nonmetric gravity theories, is adapted to the description of the electroweak interaction using the Weinberg-Salam unified SU(2) x U(1) model. The use of the TH epsilon mu formalism is thereby extended to the weak interactions, showing how the gravitational field affects W sub mu (+ or -1) and Z sub mu (0) boson propagation and the rates of interactions mediated by them. The possibility of a similar extension to the strong interactions via SU(5) grand unified theories is briefly discussed. Also, using the effects of the potentials on the baryon and lepton wave functions, the effects of gravity on transition mediated in high-A atoms which are electromagnetically forbidden. Three possible experiments to test the equivalence principle in the presence of the weak interactions, which are technologically feasible, are then briefly outline: (1) K-capture by the FE nucleus (counting the emitted X-ray); (2) forbidden absorption transitions in high-A atoms' vapor; and (3) counting the relative Beta-decay rates in a suitable alpha-beta decay chain, assuming the strong interactions obey the equivalence principle.

SLAC-PUB-2428 PC **A06**/MF **A01**
Stanford Linear Accelerator Center, CA.
Lepton Nucleon Scattering.
W. B. Atwood. Nov 79, 114p
Contract EY-76-C-03-0515

The topic of lepton-nucleon inclusive scattering is reviewed. Some of the experiments providing data on these interactions are described first. Then the constituent model of the nucleon and the contribution of various types of experiments are discussed; data from the experiments are compared and some simple predictions of the quark model are covered. Next, some of the fundamental notions behind quantum chromodynamics (QCD) are presented. Subsequent sections examine detailed tests of QCD. These include the ratio of longitudinal to transverse photoabsorption cross sections, the proton form factor in elastic ep scattering, and the dependence of structure functions on Q exp 2 . In conclusion, all the tests of QCD are tabulated, and the results are evaluated. 32 references, 33 figures, 4 tables. (ERA citation 05:021404)

20I. Plasma Physics

AD-A108 287/4 PC **A03**/MF **A01**
JAYCOR, Alexandria, VA.
Simple Analysis of Light Ion Beam Losses in Deuterium Plasma Channels.
Memorandum rept.,
D. G. Colombant, and S. A. Goldstein. 16 Nov 81, 29p NRL-MR-4640

Simple analysis of both ion beam energy losses and beam current density reduction is presented for deuterium plasma channels. It is found that whereas an optimum density may exist for reducing the beam energy losses in the channel, no optimum density can be found to minimize the beam current density reduction. Plasma channel radius effects are then examined. It is found that the total ion beam energy loss is not strongly dependent on the initial channel radius. We conclude that final focusing elements in conjunction with channels initially at rest allow for multiterawatt beams to be transported efficiently to 1 sq cm targets while the channel cross-section can be larger. (Author)

AD-A108 360/9 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Physical Mechanism of Wave-Particle Resonances in a Curved Magnetic Field.
Memorandum rept.,
J. D. Huba, and J. F. Drake. 27 Nov 81, 24p Rept no. NRL-MR-4668

The physical mechanism of wave-particle resonances in a curved magnetic field is investigated. Specifically, the energy exchange process between a wave and resonant curvature drifting particles is discussed. A general expression for the wave damping/growth rate is derived based upon physical arguments. The theory is applied to the lower-hybrid-drift instability and nonlinear consequences are discussed.

AD-A108 583/6 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor.
Aerodynamic and Electromagnetic Properties of Plasmas.
Final rept. 1 Dec 76-31 Aug 81,
Lamberto Cesari, and Joel A. Smoller. Oct 81, 15p
AFOSR-TR-81-0794
Grant AFOSR-77-3211

No abstract available.

AD-A108 677/6 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Principles and Applications of Radio Frequency Impedance Probes.
Environmental research papers,
S. T. Lai. 27 Jul 81, 24p Rept nos. AFGL-TR-81-0217, AFGL-ERP-749

The underlying principle of the radio frequency plasma probe is presented. The resonance properties of the probe's equivalent circuit with and without external magnetic field are analyzed. The admittance of the equivalent circuit is shown to posses a pole at the sheath hybrid frequency and a zero at the upper hybrid frequency. The phase of the admittance changes signature to become negative, in the range of frequency between the pole and the zero. Some significant experiments using radio frequency plasma probe for ionospheric research are briefly described.

DOE/ET/53056-4 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park.
Excitation and Ionization of Highly Charged Ions by Electron Impact. Progress Report, August 1, 1979-August 31, 1980.
D. H. Sampson. Sep 80, 22p
Contract AS02-76ET53056

The reduced cross sections Q/sub R//sup H/(nl,u) have been calculated for ionization from the nl = 4s, 4p, 4d and 4f sublevels and the results fitted to simple functions of the impact electron energy u in threshold units. With these values plus those obtained in our earlier work results are now available for all the sublevels 1s, 2s, 2p, 3s, 3p, 3d, 4s, 4p, and 4f. From the values for Q/sub R//sup H/(nl,u) one can readily obtain the cross section for direct ionization from any of these sublevels in any highly charged complex ion using the simple procedures given in our earlier work. The total ionization cross section with inclusion of the excitation-autoionization contribution has been obtained for Be-like and Li-like ions. The results for the Li-like ions N exp 4+ and O exp 5+ are in generally good agreement with recent results of Crandall and co-workers. Basic hydrogenic ion data for scaled R-matrix elements and collision strengths have been calculated for

the transitions 1s-2s, 2p, 3s, 3p, 3d; 2s, 2p-3s, 3p, 3d, 4s, 4p, 4d, 4f; and 3s, 3p, 3d-4s, 4p, 4d, 4f, 5s, 5p, 5d, 5f, 5g for the eight impact electron energies in threshold units epsilon = 1.0, 1.2, 1.5, 1.9, 2.5, 4.0, 6.0, and 10.0. Collision strengths and radiative line strengths for the delta n = 0 transitions in He-like and Be-like ions have been calculated for additional Z values so that results are now available for He-like ions with Z = 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 36, 42, 48, 54, 64 and 74 and for Be-like ions with the same Z values for Z greater than or equal to 12. All these collision strength data have been fitted to simple functions of the impact electron energy that are readily integrated over a Maxwellian to obtain collision rates. Preliminary results have been obtained for the n = 2 to n = 3 transitions in Be-like ions. (ERA citation 06:008467)

LA-8324-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Temperature Diagnostics Using Lithium-Like Satellites.
R. U. Datla, L. A. Jones, and D. B. Thomson. Oct 80, 16p
Contract W-7405-ENG-36

A 60-kJ theta-pinch was operated at a filling pressure of 16 mtorr using a gas mixture of 2% neon and 98% helium. The resonance and intercombination lines from Ne IX and the Li-like satellites were observed with a Bragg crystal monochromator. The electron temperature of the plasma was deduced from the intensity ratios of the Ne IX resonance line and the dielectronic satellites using recent theoretical calculations. The temperature values ranged from 210 eV to 340 eV during the time of occurrence of these satellites. The temperature measured at 1.0 mu s by laser scattering for a similar plasma condition was in close agreement with that obtained by the resonance line/satellite ratio. This lends confidence to use of the satellite technique for temperature measurements in other plasmas. (ERA citation 06:005577)

N82-13899/1 PC **A04**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Energy and Momentum Deposition to Plasmas Due to the Lower Hybrid Wave by a Finite Source.
N. Nakajima, H. Abe, and R. Itatani. Oct 81, 68p IPPJ-546

Heating and current generation due to the lower hybrid wave are studied using particle simulation. A propagation cone consisting of Fourier expanded modes is emphasized. The trajectory of the propagation cone is well described up to the lower hybrid resonance layer using both cold plasma approximation and the Wentzel-Kramer-Brillouin method. An ion cross field drift due to the ponderomotive force is observed. The modes in the higher side of the spectrum of the antenna play a key role for creation of the ion high energy tail. This process is called the cascade process judging from the time variation of the damping of each mode. The particle model is significantly improved using the elongated grid and the quadric spatial interpolation.

N82-13903/1 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Electromagnetic Cyclotron Harmonic Waves.
T. Ohnuma, T. Watanabe, and K. Hamamatsu. Sep 81, 15p IPPJ-536

Electromagnetic electron cyclotron harmonic waves just below the electron cyclotron harmonics were investigated numerically and experimentally. Backward waves which were observed to propagate nearly perpendicular to the magnetic field just below the electron cyclotron frequency in a high density magnetoplasma were confirmed to be in accord with the theoretical electromagnetic cyclotron waves.

N82-13904/9 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Plasma Focus Breeder.
K. Ikuta. Sep 81, 15p IPPJ-541

High voltage generation on pinched plasma by a plasma focus device was investigated. Fissile fuels are bred with the help of high current plasma focus device. A mechanism of accelerating proton beam in plasma focus device to high energy changes the inductance in plasma column because of rapid growth of plasma instability. It is concluded that a high current plasma focus device is a good candidate for the generation of energetic, intense proton beams which can be utilized for breeding fissile fuels.

N82-13906/4 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Numerical Study on the Interaction Between a Modulated Electron Beam and a Plasma.
O. Fukumasa, and R. Itatani. Sep 81, 48p IPPJ-543

Interaction of a modulated electron beam with a plasma is calculated for unbounded and bounded electron beam-plasma systems, using the method of partial simulation. In the case of the unbounded system, deformation of the beam distribution function is occurred in relation to suppression of one wave by the other wave. While, in the case of the bounded system, occurrence of deformation depends on whether feedback effects of reflected beams are present or not. The findings are qualitatively in agreement with experimental results.

N82-13907/2 PC **A06**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Data on the Backscattering Coefficients of Light Ions from Solids.
T. Tabata, R. Ito, Y. Itikawa, N. Itoh, and K. Morita. Oct 81, 118p IPPJ-AM-18
Submitted for Publication.

Data on the backscattering of H, D and He ions from solids were collected. The following parameters are considered: number backscattering coefficient energy backscattering coefficient, and the mean fractional energy of backscattered particles. Most of the data range in the region of incident energy from 1 to 50 keV. The empirical formulas, obtained from the Monte Carlo results for energies below 1 keV are plotted for energies from 10 eV to 100 keV. The rms deviations of the data from the empirical formulas are between 6 and 30 percent.

N82-13908/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Vacuum Exhaust Pressure on the Performance of MHD Ducts at High D-Field.
J. M. Smith, J. L. Morgan, and S. Y. Wang. 1982, 13p NASA-TM-82750, DOE/NASA/10769-23
Contract DE-AI01-77ET-10769
Presented at the 20TH Aerospace Sci. Meeting, Orlando, Fla., 11-14 Jan. 1982; Sponsored by Aiaa.

The effect of area ratio variation on the performance of a supersonic Hall MHD duct is investigated. Results indicate that for a given combustion pressure there exists an area ratio below which the power generating region of the duct is shock free and the power output increases linearly with the square of the magnetic field. For area ratios greater than this, a shock forms in the power generating region which moves upstream with increasing magnetic field strength resulting in a less rapid raise in the power output. The shock can be moved downstream by either increasing the combustion pressure of decreasing the exhaust pressure. The influence of these effects upon duct performance is presented.

N82-13927/0 PC **A03**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Rijnhuizen (Netherlands). Inst. voor Plasma-Fysica.
On High beta Equilibria of Plasmas in the Quasi-Uniform Current Model: Influence of Shaping the Plasma Cross Section and of the Second Order in the Inverse Aspect Ratio.
W. Schuurman, and C. Bobeldijk. Apr 81, 32p REPT-81-131
Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (Zwo).

Analytical calculations of toroidal plasma equilibria in the high beta ordering were performed in the quasi-uniform current model, varying the shape of the poloidal plasma crosssection. The effect of the second order in an expansion in the inverse aspect ratio was determined for a plasma with elliptic crosssection. Analytical representation of curves with a shape deviating from an ellipse (e.g., racetrack, triangle, rectangle) enabled the treatment of high beta equilibria of plasmas having these curves as poloidal crosssection. A smooth current profile or a flat plasma crosssection allow higher values of beta p than a skin current or a vertically pointed crosssection. Also, D-shaping improves the equilibrium beta p especially at higher values of the ellipticity. The method of crosssection shaping allows, in principle, the extension to higher mode harmonic contributions.

PPPL-1703 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Monte Carlo Evaluation of Transport Coefficients.
A. H. Boozer, and G. Kuo-Petravic. Aug 80, 40p
Contract AM02-76CH03073

A method is developed for evaluating transport coefficients in asymmetric geometries using the Monte Carlo method. The method is applied to the stellarator. (ERA citation 05:035800)

PPPL-1737 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Mode-Conversion Induced Tearing Effects in a Plasma Neutral Sheet.
P. K. Kaw, and R. N. Sudan. Jan 81, 13p
Contract AM02-76CH03073

A new collisionless dissipation mechanism which can drive tearing modes in a plasma neutral sheet is described. The new mechanism relies on the presence of a background cold plasma which leads to mode conversion into a continuous spectrum of cold plasma waves. (ERA citation 06:008476)

UCRL-84044(Rev.1) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computational Methods for Reversed-Field Equilibrium.
J. K. Boyd, S. P. Auerbach, P. A. Willmann, H. L. Berk, and B. McNamara. 15 Apr 80, 41p CONF-800456-1(Rev.1)
Contract W-7405-ENG-48
Sherwood theory meeting, Tucson, AZ, USA, 23 Apr 1980.

Investigating the temporal evolution of reversed-field equilibrium caused by transport processes requires the solution of the Grad-Shafranov equation and computation of field-line-averaged quantities. The technique for field-line averaging and the computation of the Grad-Shafranov equation are presented. Application of Green's function to specify the Grad-Shafranov equation boundary condition is discussed. Hill's vortex formulas used to verify certain computations are detailed. Use of computer software to implement computational methods is described. (ERA citation 05:025018)

20K. Solid Mechanics

AD-A108 133/0 PC **A02**/MF **A01**
Chicago Univ., IL. Dept. of Geophysical Sciences.
Explicit Solution of the Inverse Problem for a Vibrating String.
Technical rept.,
Victor Barcilon. Nov 81, 24p
Contract N00014-76-C-0034

The problem of reconstructing the density rho(x) of a vibrating string of length L from the knowledge of two spectra (lambda n)1 to infinity and (microns n) 1 to infinity is considered. The method of construction relies (i) on a formula for rho at an arbitrary point x=l in terms of the spectra (lambda n (l)) 1 to infinity and (microns n (l)) 1 to infinity associated with the natural frequencies of vibration of the portion (l, L) of the original string and (ii) on a set of first order differential equations for (lambda n(l))1 to infinity and (micron n (l)) 1 to infinity. The density is deduced by integrating these equations of the spectra and substituting in the above mentioned formula.

AD-A108 290/8 Not available NTIS
Naval Research Lab., Washington, DC. Shock and Vibration Information Center.
The Shock and Vibration Digest. Volume 13, Number 11,
Judith Nagle-Eshleman. Nov 81, 92p
Availability: Naval Research Lab., Attn: Code 5804, Washington, DC 20375 $100.00 (No copies furnished by DTIC).

The goal of the Digest is to provide efficient transfer of sound, shock and vibration technology among researchers and practicing engineers. Subjective and objective analyses of the literature are provided along with news and editorial material.

AD-A108 682/6 PC **A04**/MF **A01**
Iowa Univ., Iowa City. Coll. of Engineering.

Kinematic Analysis of Mechanical Systems.
Interim rept. for period ending Dec 79,
Rajiv Rampalli, Edward J. Haug, and Ronald R. Beck. 16 Jun 81, 68p U-OF-IOWA-60, TACOM-TR-12589
Contract DAAK30-78-C-0096

It is intended in this report to develop a method of kinematically analyzing mechanical systems. A computer code that automatically generates a set of nonlinear equations describing the system and solves them, is developed. To demonstrate the accuracy and effectiveness of the method to be developed herein, five sample problems have been solved. While all the sample problems solved are closed-loop mechanical systems, the method described here need not be confined to closed loop mechanical systems or to mechanical systems at all. In fact, the method is applicable to any system whose motion is to be described, provided adequate constraints can be incorporated into the code by the user. Examples of such systems are electro-mechanical systems with relays, switches, etc. Given the topology of a system, the necessary inputs, the method is capable of computing velocities, positions, accelerations and constraint forces on the system.

AD-A108 683/4 PC **A09**/MF **A01**
Iowa Univ., Iowa City. Coll. of Engineering.
Generalized Coordinate Partitioning in Dynamic Analysis of Mechanical Systems.
Final rept. for period ending Dec 80,
Roger A. Wehage, Edward J. Haug, and Ronald R. Beck. 16 Jun 81, 197p U-OF-IOWA-75, TACOM-TR-12590
Contracts DAAK30-78-C-0096, DAAG29-79-C-0221

A computer-based method for formulation and efficient solution of nonlinear, constrained differential equations of motion is developed for planar mechanical systems. Nonlinear holonomic constraint equations and differential equations of motion are written in terms of a maximal set of Cartesian generalized coordinates, to facilitate the general formulation of constraints and forcing functions. A Gaussian elimination algorithm with full pivoting decomposes the constraint Jacobian matrix, identifies dependent variables, and constructs an influence coefficient matrix relating variations in dependent and independent variables. This information is employed to numerically construct a reduced system of differential equations whose solution yields the total system dynamic response. A numerical integration algorithm with positive-error control, employing a predictor-corrector algorithm with variable order and step-size, is developed that integrates for only the independent variables, yet effectively determines dependent variables. A general method is developed for dynamic analysis of systems with impulsive forces, impact, discontinuous constraints, and discontinuous velocities. This class of systems includes discontinuous kinematic and geometric constraints that characterize backlash and impact within systems.

AD-A108 684/2 PC **A09**/MF **A01**
Iowa Univ., Iowa City. Coll. of Engineering.
Design Sensitivity Analysis and Optimization of Constrained Dynamic Systems.
Interim rept. for period ending Jun 79,
N. C. Barman, Edward J. Haug, and Ronald R. Beck. 16 Jun 81, 180p U-OF-IOWA-56, TACOM-TR-12587
Contract DAAK30-78-C-0096

In this report, the technical objective is the derivation of a systematic and unified theory and organization of a corresponding general computer program for the design of constrained dynamic systems by judicious selection of the most suitable methods from the following branches of mathematics and mechanics: (a) Optimization Methods, (b) Rigid Body Mechanics, (c) Numerical Integration Methods, and (d) Matrix Manipulation Methods. Accordingly, a method of formulating and automatically integrating the equations of motion and design sensitivity adjoint equations for general constrained dynamic systems is presented. Design sensitivity analysis is carried out using a state-space method that has previously been used for design optimization of linear structural systems. Application of efficient sparse matrix computational methods is shown to be suitable for both dynamic and design sensitivity analyses and for interactive strained system is treated with three degrees of freedom. Algebraic equations prescribing constraints between various bodies are then written and a Lagrangian formulation is used to write the dynamical equations of motion for each body of the system. A stiff predictor-corrector numerical integration (GEAR) algorithm is used for numerical integration of mixed systems of nonlinear differential equations of motion and algebraic equations of constraint (together with spring-damper relations and other user-supplied equations).

AD-A108 685/9 PC **A04**/MF **A01**
Iowa Univ., Iowa City. Coll. of Engineering.
Dynamic Analysis and Design of Constrained Mechanical Systems.
Interim rept. for period ending Nov 78,
Edward J. Haug, Roger A. Wehage, Ronald R. Beck, and N. C. Barman. 12 Jun 81, 57p U-OF-IOWA-50, TACOM-TR-12588
Contract DAAK30-78-C-0096

A method for formulating and automatically integrating the equations of motion of quite general constrained dynamic systems is presented. Design sensitivity analysis is also carried out using a state space method that has been used extensively in structural design optimization. Both dynamic analysis and design sensitivity analysis and optimization are shown to be well-suited to application of efficient sparse matrix computational methods. Numerical integration is carried out using a stiff numerical integration method that treats mixed systems of differential and algebraic equations. A computer code that implements the method of planar systems is outlined and a numerical example is treated. The dynamic response of a classical slider-crank is analyzed and its design is optimized. (Author)

AD-A108 702/2 PC **A03**/MF **A01**
Ohio State Univ., Columbus. Dept. of Engineering Mechanics.
Plate Vibration Research, 1976-1980.
Technical rept.,
A. W. Leissa. Dec 81, 35p Rept no. TR-1
Contract N00014-80-K-0281
Pub. in the Shock and Vibration Digest, v13 n9 p11-36 Sep 81.

No abstract available.

AD-A108 728/7 PC **A03**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Modeling Techniques for Analysis of Stiffened Shell Structures, Using Computer Program ADINA.
Final rept.,
Thomas A. Giacofci. Nov 81, 29p Rept no. DTNSRDC-81/070

The beam element available in computer program ADINA is inadequate for transient analysis of eccentrically stiffened shell structures, particularly when the lateral stability of the stiffener is of concern. As an alternative to modeling shell stiffeners with numerous continuum or transition elements, a stiffener modeling technique based on the multipoint constraint option in ADINA is presented. This technique leads to significant reductions in the number of elements and solution degrees of freedom needed for accurate stiffener modeling, yet allows inclusion in the analysis of effects of out-of-plane web distortion, longitudinal warping, and torsion. Stiffeners having various cross sectional geometries and boundary conditions have been modeled, and predicted response correlates well with experimental data. The approach is of practical significance for large stiffened shell problems, especially nonlinear analysis. (Author)

N82-13456/0 PC **A07**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Espoo (Finland).
Thin-Walled Structures. Trapezoidal Sheet Bending and under Shear Stresses.
L. H. Heselius. Jul 80, 145p VTT-11, ISBN-951-38-1123-0
In Finnish; English Summary.

The bending capacity of trapezoidal sheets provided with intermediate stiffeners, and the support reaction capacity with oversized support lengths were determined. A model which allows use of wide supports in the dimensioning of continuous trapezoidal sheets is presented. The effect of cylindrical curvature of the planes of trapezoidal sheets on the bending capacity was examined. The stiffening capacity of the frame of the trapezoidal sheets in different failures cases is reported. The effect of increasing bending capacity of the longitudinal joint in a trapezoidal sheet slab was also tested. The interaction of local and global buckling of columns constructed of thin walled rectangular hollow sections and the bending capacity of light profiled beams with both flanges continuously braced are analyzed.

PB82-146143 PC **A05**/MF **A01**
California Univ., Berkeley. Dept. of Civil Engineering.
Comparative Linear and Nonlinear Analysis of Hyperbolic Paraboloid Groined Vaults.
Final rept.,
Gerhard Schaper. Dec 80, 92p UC-SESM-80-12, NSF/RA-800626
Grant NSF-CME79-18057

Several hyperbolic paraboloid groined vaults are analyzed in order to compare the results which are based on different assumptions. The study includes (1) a membrane analysis of an uncracked concrete shell, neglecting bending effects in the shell; (2) a linear finite element analysis of an uncracked concrete shell, including membrane and bending effects; and (3) a material nonlinear finite element analysis of a reinforced concrete shell, considering cracking and inelastic behavior of the concrete and yielding of the reinforcement. Results obtained by membrane theory appear to be reasonable for a preliminary design and useful for distributed service loadings over the whole shell. From nonlinear analysis, it can be concluded that under increasing load the bending moments at the intersection between shell and groin arch increase at a decreasing rate due to cracking and the resulting decrease in shell bending stiffness. Suggested topics for further research are given.

SAND-80-1534 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Swept Narrow Band Random on Random.
F. T. Mercer. Aug 80, 34p
Contract AC04-76DP00789

The implementation of swept narrow band random on random on the HP5451C Fourier Analyzer System and the HP5427A Vibration Control System is discussed. Up to five narrow bands of a dynamically changing narrow band random spectrum can be super-imposed on a broad band random spectrum and swept at various rates to simulate field environments. (ERA citation 05:033954)

UCID-18226 PC **A09**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Users Manual for SAP4: A Modified and Extended Version of the U.C. Berkeley SAPIV Code.
S. J. Sackett. May 79, 191p
Contract W-7405-ENG-48

SAP4 is a finite element code for the static and dynamic analysis of linear elastic structures. It is based on the April 1974 version of the SAPIV code developed at U.C. Berkeley by Bathe, Wilson, and Peterson. While maintaining the same basic structure as SAPIV, SAP4 contains extensive modifications to improve the input format and I/O efficiency, and to support general restart capability and graphics postprocessing from a single compact data base. In addition, the following features have been implemented: dynamic memory allocation to ensure minimal memory usage for each problem; internal bandwidth/profile minimization; single Fourier mode capability for axisymmetric solids; near incompressible behavior for 3D solids; automatic normal rotation constraints for flat plates/shells; a general beam-type stiffness/flexibility element; consistent mass lumping by shape function weighting of element mass assignments; and piecewise exact integration for modal time history analysis. Several programs are available to aid in preparing SAP4 input and to produce time history and geometry plots of the analysis results. They are discussed, along with some simple examples. (ERA citation 05:006061)

20L. Solid-State Physics

AD-A108 390/6 PC **A06**/MF **A01**
Rockwell International, Thousand Oaks, CA. Microelectronics Research and Development Center.
Electronic Transport in Ultrathin Heterostructures.
Final rept. 1 Aug 78-31 Jul 81,
P. D. Dapkus. Oct 81, 108p Rept no. MRDC40129
Contract N00014-78-C-0711

A detailed study of the optical and electronic transport studies of ultrathin GaAlAs/GaAs heterostructures is reported. The measurements are reported on GaAlAs multiple quantum well heterostructures (MQW) and superlattices (SL) with layer dimension ranging from 200 to 30 A grown by metalorganic chemical vapor deposition (MOCVD). The measurements show that laser emission from these structures lie 36 meV below the absorption edge, consistent with LO phonon emission. The transport properties of modulation doped superlattices and single heterostructures demonstrate enhanced room temperature and low temperature mobility. (Author)

AD-A108 399/7 PC **A04**/MF **A01**
Cornell Univ., Ithaca, NY.
Microwave Semiconductor Research - Materials, Devices, Circuits.
Technical Rept. 1 Mar 77-30 Apr 81,
L. F. Eastman, C. E. C. Wood, D. W. Woodard, W. Ku, and J. M. Ballantyne. Dec 81, 69p
Contract F49620-80-C-0069

The growth and characterization of high purity and chromium doped GaAs and Al, GaAs for buffer layers in high performance GaAs FET's has been carried out. Deep level transient spectroscopy has been used to measure electron traps in Schottky diodes and GaAs FET's. The investigation of microwave field-effect transistor performance limits set by layer composition and contact geometry has been carried out. The several critical physical electronics parameters for very high voltage operation of GaAs FET's have been determined. The electric field distribution and the parasitic output conductance due to buffer layer current were studied and optimized. The use of MBE tailored doping profiles for improved microwave device operation has been studied. Improved linearity of GaAs power FET devices and the optimization of doping planes for potential barriers and other purposes were also carried out. GaAs/Al, GaAs selectively doped heterojunctions were grown by MBE and were studied for potential use in high performance transistors. High electron mobility (80,000 sq cm/v-s) at 77K was first obtained in this effort, following the optimization of the growth conditions of the Al, GaAs. In addition, high resistivity Al, GaAs buffer layers for power FET's were obtained.

AD-A108 403/7 PC **A02**/MF **A01**
Paris-6 Univ. (France). Lab. de Luminescence.
Research on the Effects of Hydrostatic Pressure on the Electronic States of Impurities.
Final rept.,
J. Mattler. Sep 81, 15p
Grant DA-ERO-78-G-063

The theoretically predicted shift of vibronic components and change of their distribution under high pressure were confirmed by the low temperature emission spectra of the natural crystal scapolite. The insensibility of the self-activated luminescence in the ZnS : B crystals to the high pressure action indicated that it comes from a tightly associated new luminescence center. The differences between the high pressure action on the cubic and hexagonal ZnS : Mn crystals are interpreted by the resonance energy transfer. The pressure shifts of the excitonic excitation bands in the ZnS and ZnSe crystals agree with the gap shifts calculated for these crystals but are smaller than the experimentally found pressure shifts of the donor-acceptor luminescence bands. (Author)

AD-A108 421/9 PC **A04**/MF **A01**
Florida Univ., Gainesville. Dept. of Materials Science and Engineering.
Electrotransport in Thin Films.
Final rept. 1 Jan 76-31 Dec 80,
R. E. Hummel, and R. T. DeHoff. 27 Oct 81, 61p AFOSR-TR-81-0708
Grant AFOSR-76-2963

The objective of this research was to develop a scientific perspective that forms a foundation for understanding the processes that lead to the development of holes in thin film metal strips. This understanding allows the prediction and control of hole formation in thin film connectors that are in integral part of all microelectronic devices, thus extending their design lifetime, and improving their reliability. This project focused upon the effects of dopants on the behavior of thin films subject to high current densities, and upon the relative contributions of the several mass transport processes that may contribute to changes in the structure of film strips. Specifically, in addition to electrotransport, which may involve both electron wind and electrolysis effects, grain boundary grooving, driven by surface tension forces, and thermotransport, driven by temperature gradients, was found to significantly alter the structure of the strip. Experimental strategies have been developed which emphasize each of these contributions,, permitting assessment of their relative roles in the overall process.

AD-A108 517/4 PC **A02**/MF **A01**
Vermont Univ., Burlington. Dept. of Chemistry.
The Electrical Properties of Na3Cu4S4, A Mixed-Valence One-Dimensional Metal.
Technical rept.,
Zbigniew Peplinski, David B. Brown, Timothy Watt, William E. Hatfield, and Peter Day. 1 Dec 81, 20p
Rept no. TR-23
Contract N00014-75-C-0756
Prepared in cooperation with North Carolina Univ. at Chapel Hill under contract N00014-76-C-0816 as TR-18.

Four probe electrical conductivity measurements from 15-300K demonstrate that the mixed-valence compound Na3Cu4S4 is metallic. Measurements on single crystals reveal that the conductivity is highly anisotropic, with enhanced conductivity parallel to the crystal needle axis, corresponding to pseudo one-dimensional (Cu4S4(3-) columns in the structure. For single crystals, resistance increases from 1/15000 ohm cm at 300 K to 1/300,000 ohm cm at 15K. A small, temperature independent magnetic susceptibility is consistent with metallic behavior. Diffuse reflectance spectra support the formulation of this compound as a Class III B mixed-valence S(2-)/S(-) solid.

AD-A108 627/1 PC **A03**/MF **A01**
California Univ., Santa Barbara.
Optical Investigations of the Recombination Processes in Laser-Annealed and Thermally-Annealed Semiconductors.
Interim rept. 1 Jul 79-30 Jun 80,
James L. Merz. Sep 81, 43p RADC-TR-81-233
Contract F19628-79-C-0128

Electron-beam-induced current and low temperature photoluminescence have been used as minority-carrier probes to investigate the perfection of beam-annealed silicon. Results for both laser and electron-beam annealing are reported. For CW laser annealing of ion implantation damage, the range of laser power over which good quality annealed material can be achieved is very limited, and strongly dependent on the substrate temperature during the anneal. At relatively high laser power, Laser-induced damage is observed, and misfit dislocations are introduced for laser power just below that required to melt the substrate. Superior results are obtained with the use of a scanning electron beam for annealing: the range of beam power is broader, and the amount of beam overlap for subsequent scans required to achieve good annealing is less for the electron-beam case compared to the case of laser annealing. Both EBIC and photoluminescence results indicate that the laser-induced damage is produced deeper in the substrate than the implanted layers. Estimates of the lattice displacement resulting from strain after laser annealing are made from the details of the photoluminescence spectra; this lattice displacement is found to be small, corresponding to 0.01% of the lattice constant. (Author)

AD-A108 638/8 PC **A02**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Physics.
Theory of Superionic Conductors.
Final rept. 30 Sep 76-30 Sep 81,
Gerald D. Mahan. Sep 81, 17p AFOSR-TR-81-0805
Grant AFOSR-76-3106

Theoretical physics research is reported on several aspects of superionic conductors. Theories of ionic conductivity are developed to explain experiments. The role of ion-phonon interaction is explored by the solution of several mathematical models of ion and electron conduction in many-particle systems. Our primary research objective is to understand why some solids have a very high conductivity of ions. Several hundred such materials have been identified. Some have usefulness in chemical devices such as batteries. We do theoretical physics research into the mechanisms of ion motion in solids, in an effort to identify why some solids conduct ions well, while others do not.

AD-A108 666/9 Not available NTIS
Stanford Univ., CA. Stanford Electronics Labs.

New Fermi Energy Pinning Behavior of Au on GaAs (110) Suggesting Increased Schottky-Barrier Heights on n-Type GaAs,
Perry Skeath, C. Y. Su, I. Hino, I. Lindau, and W. E. Spicer. 23 Mar 81, 3p
Contracts N00014-75-C-0289, N00014-79-C-0072
Availability: Pub. in Applied Physics Letters, v39 n4 p349-351, 15 Aug 81 (No copies furnished by DTIC/NTIS).

No abstract available.

PB82-135898 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Semiconductor Technology Program - Progress Briefs.
Interim rept. 1 Apr-30 Jun 81,
K. F. Galloway, R. I. Scace, and E. J. Walters. Nov 81, 13p NBSIR-81-2230-3
Contract N00030-79-C-0096, ARPA Order-3882
See also report for Jan-Mar 81, AD-A102 895. Sponsored in part by Department of Energy, Washington, DC. Div. of Electric Energy Systems, Defense Nuclear Agency, Washington, DC., and National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.

This report provides information on the current status of NBS work on measurement technology for semiconductor materials, process control, and devices. Emphasis is placed on silicon and silicon-based devices. Highlighted activities include semi-insulating GaAs characterization, an automatic scanning spectroscopic ellipsometer, linewidth measurement and coherence, bandgap narrowing effects in silicon, the evaluation of electrical linewidth uniformity, and arsenic-implanted profiles in silicon. In addition, recent publications and publications in press are listed. The report is not meant to be exhaustive; contacts for obtaining further information are listed.

PB82-860354 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nuclear Magnetic Resonance of Solids. 1972-January, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1972-Jan 82.
Jan 82, 106p
Supersedes PB81-858565.Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

The application of nuclear magnetic resonance techniques for the determination of the crystal structure of solids is discussed. Emphasis is placed on semiconductor materials as well as the effect of very low temperatures. Experimental techniques are discussed, and specific information is given on organic solids and solid state biology. (This updated bibliography contains 103 citations, 54 of which are new entries to the previous edition.)

SAND-80-1697C PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Physics.
Kinetics of Excitons, Biexcitons and Free Carriers in Si.
P. L. Gourley, and J. P. Wolfe. 1980, 4p CONF-800940-1
Contract AC04-76DP00789
15. international conference on the physics of semiconductors, Kyoto, Japan, 1 Sep 1980.

Strain-confinement method was used to produce a local thermodynamic equilibrium between the various excitonic species in ultrapure Si. The steady-state and transient behavior of these particles is examined and interpreted with sets of coupled kinetic equations. (ERA citation 05:034373)

SERI/PR-9079-1-T1 PC **A03**/MF **A01**
Xerox Corp., Palo Alto, CA. Palo Alto Research Center.
Structural and Electronic Studies of Defects in Amorphous Silicon. Technical Progress Report, March-May 1980.
R. A. Street. 15 Jul 80, 45p
Contract AC02-77CH00178

Proton magnetic resonance data are presented for plasma-deposited amorphous Si:H as a function of annealing temperature up to 650 exp 0 C. The data indicate that hydrogen diffuses internally before major evolution occurs, that transfer of hydrogen occurs

from a heavily clustered phase to a dilute phase coincident with evolution and that evolution occurs initially from the heavily clustered phase. Comparison with infrared data indicates that the heavily clustered phase can be either SiH/ sub x/t = 2,3) or SiH. (ERA citation 05:032561)

UWFDM-381 PC **A02**/MF **A01**
Wisconsin Univ.-Madison.
Further Investigations of the Upper Critical Field and the High Field Critical Current Density in Nb-Ti and Its Alloys.
D. G. Hawksworth, and D. C. Larbalestier. Sep 80, 6p CONF-800980-32
Contract AS02-78ET52048
Applied superconductivity conference, Santa Fe, NM, USA, 29 Sep 1980.

This paper reports further measurements of Hc sub 2 in the Nb-Ti-Ta and Nb-Ti-Hf systems. Whilst we find only small enhancements of approx. 0.3 Tesla in mu sub 0 Hc sub 2 (4.2 exp 0 K) compared to binary Nb-Ti, at 2 exp 0 K there is a wide composition range in the Nb-Ti-Ta system where mu sub 0 Hc sub 2 (2 exp 0 K) exceeds 15 Tesla, reaching a maximum of 15.5 Tesla. This represents an enhancement of 1.3 Tesla over unalloyed Nb-Ti. By comparison alloys in the Nb-Ti-Hf system show a maximum enhancement in mu sub 0 Hc sub 2 (2 exp 0 K) of only 0.3 Tesla. The reasons both for the enhancements in Hc sub 2 and for the differences in behavior shown by alloys containing Ta and Hf are briefly discussed. This paper also discusses common features in the behavior of the high field critical current density, J/sub c/, of four commercial Nb-Ti composites and upon the basis of this behavior predict the enhancements in high field J/sub c/ to be expected from using Nb-Ti-Ta and its alloys. (ERA citation 06:005083)

20M. Thermodynamics

AD-A108 415/1 Not available NTIS
New York Univ., NY. Courant Inst. of Mathematical Sciences.
Propagation of Thermal Waves in an Inhomogeneous Medium,
Shoshana Kamin, and Philip Rosenau. Sep 80, 22p
Grant AFOSR-76-2881
Availability: Pub. in Communications on Pure and Applied Mathematics, v34 p831-852 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

SAND-79-1374C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Finite Element Analysis of Convective Heat Transfer in a Porous Medium.
D. K. Gartling. 1979, 20p CONF-800613-3
Contract EY-76-C-04-0789
International conference on finite element in flow problems, Banff, Alberta, Canada, 10 Jun 1980.

A numerical procedure based on the Galerkin form of the finite element method is developed for the solution of isothermal and non-isothermal flow problems in porous materials. The methodology is demonstrated by application to the classic free convection problem of a saturated porous layer heated from below. Results are presented for steady state flows at low Rayleigh numbers and for an interesting transient flow at a higher Rayleigh number. (ERA citation 05:022814)

20N. Wave Propagation

AD-A108 182/7 PC **A02**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
TM/TE Polarization Ratios in a Sample of 30 kHz Sferics Received at Altitudes from 0 to 70 km,
R. P. Harrison, E. A. Lewis, J. B. Donohoe, and J. E. Rasmussen. Aug 81, 17p Rept no. RADC-TR-81-235

A rocket-borne payload, carrying both vertical and horizontal magnetic dipole antennas and receiving instrumentation, was flown from Wallops Island, Virginia, to observe the Transverse Electric (TE) and Transverse Magnetic (TM) polarization components of individual sferics at 30 kHz. During the 2-1/2 min flight to apogee at 96 km, 293 individual sferics were observed. Upon applying corrections for difference in azimuthal antenna patterns, it was concluded that the TM noise fields were larger than the TE fields by about 15 dB near the ground, and approximately equal at 60 km. (Author)

AD-A108 291/6 PC **A04**/MF **A01**
State Univ. of New York at Albany. Space Astronomy Lab.
Experimental Results of Multiple Scattering.
Final rept. Mar 79-Jul 80,
Donald W. Schuerman, and Ru T. Wang. Nov 81, 53p ARCSL-CR-81003
Contract DAAG29-79-C-0055

Microwave analog measurements of scattering by ensembles of 2n(n=1,2,3) interacting spheres are presented. Emphasis is placed on the amplitude and phase measurements of the forward scattered wave as a function of the mutual separation of the spheres and the orientation of the ensembles with respect to the incident beam. A few side scattering and angular distribution measurements indicate the existence of specular scattering at particular array orientations for some of the two-sphere ensembles. A short historical sketch, a description of the experiments, and phenomenological explanations of the results are also given.

AD-A108 395/5 PC **A04**/MF **A01**
Syracuse Univ., NY. Dept. of Electrical and Computer Engineering.
Electromagnetic Coupling to a Conducting Body of Revolution with a Homogeneous Material Region.
Phase rept.,
Joseph R. Mautz, and Roger F. Harrington. Jul 81, 66p RADC-TR-81-202
Contract F30602-79-C-0011

A numerical solution for electromagnetic coupling to a perfectly conducting body of revolution with a loss-free homogeneous material region is developed. The material region is exposed by a rotationally symmetric aperture in the conducting body. Application of the equivalence principle introduces an unknown electric current on the surface of the conducting body, and both an unknown equivalent electric current and an unknown equivalent magnetic current in the aperture. These currents satisfy the integral equations obtained by annihilating the tangential components of the electric field on the surface of the conducting body and by enforcing continuity of the tangential components of the electric and magnetic fields across the aperture. These integral equations are solved numerically by means of the method of moments. Numerical results for the above mentioned currents are presented for four different conducting bodies, each of which has a dielectric region and is excited by an axially incident plane wave. The computer program that was used to calculate these currents allows for the more general case of oblique incidence. This program is described and listed along with sample input and output in a forthcoming report.

AD-A108 408/6 PC **A04**/MF **A01**
Naval Research Lab., Washington, DC.
Multipath VLF Propagation Effects on Correlation Receivers,
Francis J. Kelly, J. P. Hauser, H. M. Beck, and F. J. Rhoads. 18 Sep 81, 52p Rept no. NRL-8521

The effect of electromagnetic propagation at very low frequency in the earth ionosphere waveguide can distort wideband communication waveforms and produce a splitting of the correlation peak of the received signal at a model interference null where multipath signals arrive out of phase. Propagation from an inclined dipole antenna trailed behind an orbiting aircraft can cause split correlation pattern to fluctuate throughout the orbit period. For the case of an MSK (minimum-shift-keying) signal format, expressions and graphs are given for the correlation vector, as a function of receiver synchronization time and aircraft flight direction. (Author)

AD-A108 500/0 PC **A05**/MF **A01**
Nebraska Univ., Lincoln. Dept. of Mathematics.
Transient Fields Produced in Heterogeneous Bodies by Electromagnetic Pulses.
Final rept. 8 May-30 Sep 80,
Robert J. Krueger. Oct 81, 82p SAM-TR-80-12
Contract F33615-78-D-0629

An exact analytical technique for determining induced electromagnetic fields in a one-dimensional medium is developed. The incident field, which impinges normally on the medium, is an electromagnetic pulse of arbitrary shape and duration. The medium is of finite depth and can have arbitrarily specified and nonconstant permittivity and conductivity. This analytical result is implemented in a computer program called HATS (High Accuracy Temporal Solution), which is virtually free of numerically dispersion. Several sample problems are formulated and then solved via this program. Appendix B supplies a manual that details use of the program and includes a source listing of HATS, sample input, and plots. (Author)

AD-A108 578/6 PC **A04**/MF **A01**
Pacific-Sierra Research Corp., Santa Monica, CA.
Integral Equation Approach to the Propagation of Low-Frequency Groundwaves over Irregular Terrains: II. Two-Dimensional Terrain Features and Elevated Receivers.
Final technical rept. Oct 79-May 81,
E. C. Field, Jr., S. Gayer, and B. D'Ambrosio. Oct 81, 69p PSR-1113, RADC-TR-81-287
Contract F19628-78-C-0088

This report presents solutions of the one- and two-dimensional integral equations that describe groundware propagation. Considered are the effects of: (1) terrain irregularities that are narrower than a Fresnel zone, and (2) receiver elevations. The results define the conditions under which the simpler one-dimensional equation can be used, as well as those that demand the more complicated two-dimensional form. A frequency of 100 kHz is assumed throughout, although certain results are easily scaled to other frequencies. It is well known that the one-dimensional equation is invalid unless the terrain is nearly uniform across a Fresnel zone. It has been found that for obstacles narrower than about 10 km and typical path-lengths the one-dimensional equation erroneously predicts propagation anomalies that (1) are independent of width, and therefore too large, and (2) diminish too slowly at long distances. Considerable error can be incurred by applying the one-dimension equation to moderately sized terrain features. For examples, for a path-length of 500 km, that equation overstates by a factor of four the effect of an obstacle 6 km in diameter. It cannot give accurate results unless the diameter approaches a Fresnel zone width-which exceeds 10 km for long propagation paths. Even for wide obstacles, the one-dimensional formulation neglects reflection and interference phenomena.

AD-A108 751/9 PC **A10**/MF **A01**
Mission Research Corp., Santa Barbara, CA.
Theory of EMP Coupling in the Source Region.
Final rept. 1 Feb 79-28 Feb 80,
Conrad L. Longmire, and James L. Gilbert. 28 Feb 80, 216p MRC-R-546, DNA-5687F
Contract DNA001-79-C-0186

This report presents methods, primarily analytical, for calculating the coupling of EMP to systems in the source region. The first chapter discusses Maxwell's equations and units. The second chapter presents an adequate model for the impedance of soils, and discusses causality and reality conditions on solutions in the domain of complex variables. The third chapter is a survey of EMP sources and fields for surface bursts. The remaining chapters discuss coupling to short buried conductors, long buried conductors, short vertical conductors in the air, and long elevated conductors. (Author)

N82-13300/0 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Microwave Attenuation and Brightness Temperature Due to the Gaseous Atmosphere: A Comparison of JPL and CCIR Values.
E. K. Smith, and J. W. Waters. 15 Aug 81, 55p
NASA-CR-165027, JPL-PUB-81-81
Contract NAS7-100

A sophisticated but flexible radiative transfer program designed to assure internal consistency was used to produce brightness temperature (sky noise temperature in a given direction) and gaseous attenuation curves. The curves, derived from atmospheric models, were compared and a new set was derived for a specified frequency range.

PB82-134636 PC **A04**/MF **A01**
Cambridge Univ. (England). Dept. of Engineering.
Computer Program Description - An Improved Finite Element Program for Three-Dimensional Electromagnetic Problems,
J. P. Webb. Oct 81, 53p CUED/B-ELECT/TR-65
Also pub. as ISSN-0309-7412.

The program described may be used to find the three-dimensional time-harmonic electric or magnetic field in a volume containing linear, sourceless, isotropic materials with varying and lossy permittivity or permeability. In general the program has application in cases for which the geometry does not permit a reduction in the dimension of the underlying three-dimensional differential equations. The program may be used to find the field patterns and resonant frequencies of loaded cavities. It may also be used to solve a wide range of waveguide scattering problems, by first formulating them as loaded-cavity problems.

PB82-139239 PC **A02**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
The Attenuation of Electromagnetic Waves by Multiple Knife-Edge Diffraction,
Lewis E. Vogler. Oct 81, 25p NTIA/REPORT-81-86

Starting from work by Furutsu, a multiple knife-edge attenuation function is derived. A series representation of the function is developed which is amenable to computer implementation. Comparisons of computer-generated numerical values with known results are presented and discussed.

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A108 363/3 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Weak and Strong Ignition. I. Numerical Simulations of Shock Tube Experiments.
Memorandum rept.,
E. S. Oran, T. R. Young, J. P. Boris, and A. Cohen. 7 Dec 81, 37p Rept no. NRL-MR-4664

Detailed one-dimensional calculations have been performed to simulate weak and strong ignition in reflected shock tube experiments in hydrogen-oxygen-argon mixtures. It is found that the experiment and simulations agree well in the strong ignition case studied. In the weak ignition case, the simulations show the same qualitative behavior as the experiment. Here ignition starts at a distance away from the reflecting wall at a time much earlier than the calculated chemical induction time. This latter effect is shown to arise because of the sensitivity of the chemical induction time to fluctuations in the calculation. In the calculations these fluctuations arise from small numerical inaccuracies. In experiments, they can arise from a number of sources including nonuniformities in the incident shock wave leading to non-uniform reflection, thermal conduction to the walls, and interactions with boundary layers. (Author)

AD-A108 487/0 PC **A02**/MF **A01**
AeroChem Research Labs., Inc., Princeton, NJ.
Ions in Fuel-Rich and Sooting Acetylene and Benzene Flames.
Interim rept.,
D. B. Olson, and H. F. Calcote. 1981, 14p AFOSR-TR-81-0717
Contract F49620-77-C-0029
Pub. in Proceedings of the International Symposium on Combustion (18th), Waterloo, Canada, 1981 p453-464.

No abstract available.

AD-A108 580/2 PC **A10**/MF **A01**
Ohio State Univ., Columbus. Dept. of Aeronautical and Astronautical Engineering.
Ignition, Combustion, Detonation and Heat Addition to Established Flows.
Interim technical rept. 1 Apr 80-1 May 81,
R. Edse, and T. D. Costello. Aug 81, 215p AFOSR-TR-81-0788
Grant AFOSR-78-3604

Detonation Induction distances have been measured at room-temperature at various initial pressures in hydrogen-oxygen third gas mixtures. Various detonation parameters of these mixtures have been calculated at various initial temperatures down to 100K. A conical burner tube with a wide approach section has been set up to measure the normal flame speeds of various hydrogen-oxygen third gas mixtures at temperatures down to 200K. A new combustion tube is being assembled for the study of heat addition to an existing flow of air. Rigorous calculations have been made to evaluate the performance of ramjets using hydrogen or propane as fuel and flying at speeds ranging from M (infinity) = 1 to M (infinity) = 10. (Author)

DOE/ET/13334-T1 PC **A04**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Investigation of the Combustion Characteristics of Fuel Droplet Arrays. Final Technical Report.
J. J. Sangiovanni. Jun 80, 72p
Contract AC22-78ET13334

The program was directed at establishing the nature and extent of droplet/droplet interaction and the multicomponent nature of real fuels on the ignition and combustion characteristics of spray flames. A unique free-droplet combustion experiment provided the present investigation with a well-controlled simulation of spray combustion. Various theoretical models were used. Experimental observations indicate that ignition delay times increase sharply by about three-fold when droplet spacings are reduced to less than five droplet diameters. Results of theoretical predictions indicate that as droplet spacing is made smaller, the effect of droplet/droplet interaction on ignition delay becomes increasingly more pronounced for small droplets, low gas phase temperatures, and fuels of low volatility. Although this result suggests that ignition of heavy grades of alternative liquid fuels will be inhibited in dense sprays, other theoretical and experimental results indicate that the addition of a small quantity of a volatile component to a heavy fuel shortens ignition times substantially. Observed burning times show a gradual, but substantial, increase as a result of droplet/droplet interaction; as droplet spacing is decreased from 40 to 5 diameters, burning times increase by about 60%. A compilation of data for an extensive range of experimental parameters show universally that the amount by which droplet/droplet interaction increases burning times depends only on droplet spacing and not on the fuel type or the ambient conditions. Burning times of multicomponent fuel droplets are found to be weighted heavily toward the burning time for the least volatile component. Theoretical predictions demonstrate that this independence of burning times on the initial fuel mixture proportions can be ascribed to liquid phase mass diffusion limitations. (ERA citation 06:003578)

N82-13186/3 PC **A14**/MF **A01**
San Jose State Univ., CA.
Development and Testing of Dry Chemicals in Advanced Extinguishing Systems for Jet Engine Nacelle Fires.
Final Report.
R. L. Altman, A. C. Ling, L. A. Mayer, and D. J. Myronik. Sep 79, 314p NASA-CR-165011
Grant NSG-2165

The effectiveness of dry chemical in extinguishing and delaying reignition of fires resulting from hydrocarbon fuel leaking onto heated surfaces such as can occur in jet engine nacelles is studied. The commercial fire extinguishant dry chemical tried are sodium and potassium bicarbonate, carbonate, chloride, carbamate (Monnex), metal halogen, and metal hydroxycarbonate compounds. Synthetic and preparative procedures for new materials developed, a new concept of fire control by dry chemical agents, descriptions of experiment assemblages to test dry chemical fire extinguishant efficiencies in controlling fuel fires initiated by hot surfaces, comparative testing data for more than 25 chemical systems in a 'static' assemblage with no air flow across the heated surface, and similar comparative data for more than ten compounds in a dynamic system with air flows up to 350 ft/sec are presented.

N82-13504/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Catalytic Combustion of Residual Fuels.
D. L. Bulzan, and R. R. Tacina. 1981, 20p NASA-TM-82731, E-1040
Contract DE-AI01-77ET-10350
Presented at 5TH Workshop on Catalytic Combustion, San Antonio, Tex., 15-16 Sep. 1981.

A noble metal catalytic reactor was tested using two grades of petroleum derived residual fuels at specified inlet air temperatures, pressures, and reference velocities. Combustion efficiencies greater than 99.5 percent were obtained. Steady state operation of the catalytic reactor required inlet air temperatures of at least 800 K. At lower inlet air temperatures, upstream burning in the premixing zone occurred which was probably caused by fuel deposition and accumulation on the premixing zone walls. Increasing the inlet air temperature prevented this occurrence. Both residual fuels contained about 0.5 percent nitrogen by weight. NO sub x emissions ranged from 50 to 110 ppm by volume at 15 percent excess O2. Conversion of fuel-bound nitrogen to NO sub x ranged from 25 to 50 percent.

N82-13507/0 PC **A05**/MF **A01**
Case Western Reserve Univ., Cleveland, OH.
Transient Catalytic Combustor Model.
Final Report.
J. S. Tien. May 81, 87p NASA-CR-165324, DOE/NASA/3230-1
Grant NSG-3230, Contract DE-AI01-77CS-51040

A quasi-steady gas phase and thermally thin substrate model is used to analyze the transient behavior of catalytic monolith combustors in fuel lean operation. The combustor response delay is due to the substrate thermal ineria. Fast response is favored by thin substrate, short catalytic bed length, high combustor inlet and final temperatures, and small gas channel diameters. The calculated gas and substrate temperature time history at different axial positions provides an understanding of how the catalytic combustor responds to an upstream condition change. The computed results also suggest that the gas residence times in the catalytic bed in the after bed space are correlatable with the nondimensional combustor response time. The model also performs steady state combustion calculations; and the computed steady state emission characteristics show agreement with available experimental data in the range of parameters covered. A catalytic combustor design for automotive gas turbine engine which has reasonably fast response (1 second) and can satisfy the emission goals in an acceptable total combustor length is possible.

SAI-129-79-PGH PC **A10**/MF **A01**
Science Applications, Inc., McLean, VA.
Reliability Analysis of the Georgetown University Atmospheric Fluidized Bed Combustor. Final Report.
J. E. Hammelman, R. E. Land, J. A. Simmons, and P. J. Wood. 30 Nov 79, 208p
Contract EW-78-C-21-8333

A preliminary predictive reliability analysis for the Georgetown University Atmospheric Fluidized Bed Combustor was performed using a Failure Modes and Effects Analysis (FMEA) technique. The analysis identified the plant areas expected to be more troublesome during the operational stages. Recommendations are made for spare parts, operating procedures and future data collection and reporting activities. (ERA citation 05:024543)

SAND-80-8663 PC **A03**/MF **A01**
Sandia National Labs., Livermore, CA.
Phenomenological Description of Particulate Formation During Constant Volume Combustion.
T. M. Dyer, and W. L. Flower. Nov 80, 40p CONF-8010135-3
Contract AC04-76DP00789
General Motors Research Laboratory conference, particulate carbon: atmospheric life cycle, Warren, MI, USA, 12 Oct 1980.

Experiments to characterize soot particulate formation processes during the combustion of rich homogene-

ous mixtures have been conducted in a constant volume combustion bomb. Soot formation is observed to occur very rapidly in the flame front, and the particles are dispersed over the burned gas region as these gases are continually compressed. Particles sampled and analyzed by transmission electron microscopy exhibit three-dimensional chain-like structures. In the present premixed experiments, any parameter change that increases the flame zone temperature, such as reducing the diluent concentration, decreasing the diluent heat capacity, increasing the initial reactant temperature, or changing the fuel type, reduces the quantity of soot formed. Thus, temperature is shown to be a key parameter in determining the tendency of a mixture to soot. In many of these tests, burned gas temperature is nearly constant with time, suggesting that particulate blackbody radiation may be a stabilizing influence on the burned gas temperature. Coupling this radiation back into the chamber influences the particulate oxidation process and actually reduces the quantity of soot formed. (ERA citation 06:005033)

SERI/TR-332-586 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Research into the Pyrolysis of Pure Cellulose, Lignin, and Birch Wood Flour in the China Lake Entrained-Flow Reactor.
J. Diebold. Jun 80, 41p
Contract AC02-76CH00178

This experimental program used the China Lake entrained-flow pyrolysis reactor to briefly investigate the pyrolysis of pure cellulose, pure lignin, and birch wood flour. The study determined that the cellulose and wood flour do pyrolyze to produce primarily gaseous products containing significant amounts of ethylene and other useful hydrocarbons. During attempts to pyrolyze powdered lignin, the material melted and bubbled to block the reactor entrance. The pure cellulose and wood flour produced C sub 2 + yields of 12% to 14% by weight, which were less than yields from an organic feedstock derived from processed municipal trash. The char yields were 0.1% by weight from cellulose and 1.5% from birch wood flour - one to two orders of magnitude less than were produced from the trash-derived feedstock. In scanning electron microscope photographs, most of the wood flour char had a sintered and agglomerated appearance, although some particles retained the gross cell characteristics of the wood flour. The appearance of the char particles indicated that the material had once been molten and possibly vapor before it formed spheroidal particles about 1 mu m diameter which agglomerated to form larger char particles. The ability to completely melt or vaporize lignocellulosic materials under conditions of high heating rates has now been demonstrated in a continuous flow reactor and promises new techniques for fast pyrolysis. This char was unexpectedly attracted by a magnet, presumably because of iron contamination from the pyrolysis reactor tube wall. The production of water-insoluble tars was negligible compared to the tars produced from trash-derived feedstock. The production of water-soluble organic materials was fairly low and qualitatively appeared to vary inversely with temperature. This study was of a preliminary nature and additional studies are necessary to optimize ethylene production from these feedstocks. (ERA citation 05:034666)

21D. Fuels

AD-A108 484/7 PC **A02**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Thermodynamic Properties of Cyclopropylamine, Cyclopentylamine, and Methylenecyclobutane.
Interim rept.,
H. L. Finke, J. F. Messerly, and S. H. Lee-Bechtold.
10 Sep 79, 13p CONTRIB-237, AFOSR-TR-81-0753
Grants AFOSR-ISSA-70-0001, AFOSR-ISSA-71-0001
Pub. in Jnl. of Chemical Thermodynamics, v13 p345-355 1981.

No abstract available.

AD-A108 530/7 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Status of Strategic Petroleum Reserve Activities--September 1981.
2 Oct 81, 13p Rept no. GAO/EMD-82-7
See also Rept. no. GAO/EMD-81-136 dated 28 Aug 81.

Title VIII of the Energy Security Act requires the President to fill the Strategic Petroleum Reserve (SPR) at an average rate of at least 100,000 barrels per day for fiscal year 1981 and each succeeding fiscal year. This report discusses the Government's activities to contract for SPR oil as of September 29, 1981. It also discusses the volume of oil delivered to the Department of Energy's (DOE's) SPR storage facilities and the status of these facilities as of September 21, 1981. The report is based on our review of DOE and Defense Fuel Supply Center (DFSC) program documents, and of publications and studies related to the program. We also interviewed officials in DOE and DFSC. We did not verify the available capacity of SPR storage facilities nor the volume of oil received by DOE.

LA-8568-PR PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Methane Hydrate Resource Assessment Program. Progress Report, April-June 1980.
B. L. Barraclough. Oct 80, 29p
Contract W-7405-ENG-36

This is the first quarterly report describing progress at the Los Alamos Scientific Laboratory on a program to study the nature, occurrence, and resource potential of methane (natural gas) hydrates. Several options are discussed for fielding an experimental program in the North American arctic, in conjunction with ongoing operations. Analysis indicates that a cooperative program involving DOE/LASL, the Canadian government, and Panarctic Oils, Ltd., fielded at a drilling site in the Canadian Arctic Islands, probably offers the greatest probability of overall program success. A comprehensive series of away-from-hole (remote), downhole, and core measurements, to be performed at a site determined to be underlain with hydrates, is outlined. Objectives and progress of a laboratory effort to study synthetic hydrates are briefly described. A preliminary energy-balance-type analysis of hydrate formation stimulation by hot fluid injection, indicates significant, but probably uneconomic (for the arctic), rates of natural gas production might be feasible. (ERA citation 06:004526)

MLM-2782 PC **A03**/MF **A01**
Mound Facility, Miamisburg, OH.
Characterization of Pricetown I Underground Gasification Knockout Pot Condensates.
S. M. Craven, B. D. Craft, V. M. Franchetti, C. Kinard, and E. B. Nunn. 20 Nov 80, 35p
Contract AC04-76DP00053

The light oil collected in the knockout pot during the underground coal gasification (UCG) experiment at Pricetown, West Virginia, was characterized. Boiling range, elution chromatography, gas chromatography, mass spectrometry, nuclear magnetic resonance, infrared spectroscopy, elemental analysis, and physical tests were used to characterize the oil. The oil can be characterized as a light, highly aromatic mixture with significant amounts of phenols (10 to 25%). Results of various analyses are internally consistent and correlate with process changes. Oil characteristics, then, may be used to monitor UCG experiments. The oil differs from that produced from Western UCG subbituminous coal experiments in that it does not contain significant amounts of aliphatic molecules like paraffins and naphthenes. Its potential value is dependent on the amount of oil produced. It can be either a pollutant or a valuable source of chemicals depending on the quantities produced. The water from the knockout pot contains many polynuclear aromatic hydrocarbons at the milligram per liter level and phenols at the gram per liter level. The work was done for the following reasons: (1) The coal tar (from hereon called oil because of its volatile nature) may contain environmentally hazardous chemical compounds; (2) It may be useful as a synthetic fuel; (3) It may be useful as a petrochemical feedstock; and (4) It may be useful in monitoring the UCG process. (ERA citation 06:003318)

MLM-2783 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Analytical Procedures Used in Characterization of Knockout-Pot Condensates from the Pricetown I Underground Gasification.
S. M. Craven, B. D. Craft, V. M. Franchetti, C. Kinard, and E. B. Nunn. 26 Nov 80, 11p
Contract AC04-76DP00053

This report summarizes the various analytical methods used to analyze the liquids produced in the Pricetown I underground coal gasification experiment. Techniques used to analyze the oil include gas chromatography/mass spectrometry; infrared spectroscopy; NMR spectroscopy; elemental analysis for carbon, hydrogen, nitrogen, oxygen and sulfur; boiling range; elution chromatography; specific gravity; viscosity; and vacuum distillation. The water was analyzed by extraction techniques followed by gas chromatography/mass spectroscopy. (ERA citation 06:003335)

N82-13243/2 PC **A02**/MF **A01**
Engineering Societies Commission on Energy, Inc., Washington, DC.
Barriers to the Utilization of Synthetic Fuels for Transportation.
Final Report.
H. W. Parker, and M. J. Reilly. Oct 81, 25p NASA-CR-165517, DOE/NASA-7307/1
NASA ORDER C-57307-D, Contract DE-AI01-81CS-50006

The principal types of engines for transportation uses are reviewed and the specifications for conventional fuels are compared with specifications for synthetic fuels. Synfuel processes nearing the commercialization phase are reviewed. The barriers to using synfuels can be classified into four groups: technical, such as the uncertainty that a new engine design can satisfy the desired performance criteria; environmental, such as the risk that the engine emissions cannot meet the applicable environmental standards; economic, including the cost of using a synfuel relative to conventional transportation fuels; and market, involving market penetration by offering new engines, establishing new distribution systems and/or changing user expectations.

N82-13545/0 PC **A03**/MF **A01**
Pau Univ. (France).
Microemulsions, Emulsions and Related Systems: Energy Applications Microemulsions, Emulsions et Systemes Connexes: Applications Energetiques.
1980, 29p
Text in French. Presented at Journee d'Etudes on Emulsions, Microemulsions et Systemes Connexes, Agents de Recuperation, de Stockage et de Transformation d'Energie, Pau, France, 25 Jan. 1980.

Summaries of 16 lectures are presented. Topics include: oil recovery, thermodynamics of surface-active agents and microemulsions, interpretation of properties particular to alcohols in water-alcohol-oil ternary systems, phase diagrams and interfacial properties of the system water-dodecane-pentanol-sodium octylbenzene sulfonate, and modeling structural inversion in microemulsions. Other subjects are: numerical study of diphasic one and two dimensional flow in a porous medium, storage and transport of low temperature thermal energy as latent heat in dispersed systems, and the dynamics of nonNewtonian solutions.

N82-13546/8 PC **A05**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Development and Optimization of Hydrogen Storage Materials Using Surface Analytical Techniques Entwicklung und Optimierung von Hyridspeicher-Materialien Unter Einsatz Grenzflaechenphysikalischer Analyseverfahren.
E. Hamer, W. Gerhard, C. Plog, and H. W. Schroeder. 1980, 96p BMVG-FBWT-80-6
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

The role of surface characteristics and properties in the hydrogen storage capability of various materials is studied and optimization proposals are formulated. The hydration properties of FeTi, LaNi5 and Mg/Ni-alloys are correlated with surface data from secondary ion mass spectroscopy and Auger electron spectroscopy as well as with a complementary volume characterization. The hydrogen dissociation catalysis at the surface provoked by oxygen-induced segregation is confirmed. The uptake of CO by the surface is investigated and the expected poisoning influence of contamination is discussed. Among the optimization proposals, the influence of palladium coating and selection through correlation between hydration properties and magnetic properties of the different materials were experimentally assessed.

ORNL/MIT-294 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.

Coal Block Pyrolysis: Effects of Changing Surface Characteristics.
G. L. Alexander, B. V. Hu, and A. H. Kwai. Oct 80, 31p
Contract W-7405-ENG-26

A microgravimetric balance was used to study the surface characteristics of char from the block pyrolysis of wet and dry Texas lignite under argon and hydrogen. Nitrogen, carbon dioxide, and water isotherms with corresponding Brunauer-Emmett-Teller (BET) surface areas and Dubinin-Radushkevich-Kaganer (DRK) micropore volumes were obtained. The water isotherm showed the existence of hydrophilic and hydrophobic sites not apparent from N sub 2 and CO sub 2 isotherms. Char characteristics were related to pyrophoricity, with loss of microporosity and pyrophoricity observed for chars produced under hydrogen but not under argon sweep gas. (ERA citation 05:037502)

ORNL-5630 PC **A15**/MF **A01**
Oak Ridge National Lab., TN.
Fossil Energy Program. Quarterly Progress Report for the Period Ending December 31, 1979.
Apr 80, 336p
Contract W-7405-ENG-26

This quarterly report covers the progress made during the period September 30 through December 31 for the Oak Ridge National Laboratory research and development projects that are carried out in support of the increased utilization of coal and other fossil fuel alternatives to oil and gas as sources of clean energy. These projects are supported by the DOE Divisions of Fossil Fuel Processing, Fossil Fuel Utilization, Fossil Fuel Extraction, Planning and Systems Engineering, Basic Energy Sciences, Office of Health and Environmental Research, Office of Environmental Compliance and Overview, and by the Tennessee Valley Authority and the EPA Office of Research and Development through interagency agreements with the DOE. (ERA citation 05:025119)

PAT-APPL-6-315 584 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Supercritical Multicomponent Solvent Coal Extraction.
Patent Application,
W. H. Corcoran. Filed 30 Oct 81, 27p N82-12241/7, NASA-CASE-NPO-15767-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The yield of organic extract from the supercritical extraction of coal with larger diameter organic solvents such as toluene is increased by use of a minor amount of from 0.1 to 10% by weight of a second solvent such as methanol having a molecular diameter significantly smaller than the average pore diameter of the coal.

PAT-APPL-6-315 587 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Hydrodesulfurization of Chlorinated Coal.
Patent Application,
J. J. Kalvinskas, and N. K. Rohatgi. Filed 30 Oct 81, 24p N82-12240/9, NASA-CASE-NPO-15304-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method of desulfurization is described in which high sulfur coals are desulfurized by low temperature chlorinolysis of coal in liquid media, preferably water, followed by hydrodesulfurization at a temperature above 500 C. The coals are desulfurized to an extent of up to 90% by weight and simultaneously dechlorinated to a chlorine content below 0.1% by weight. The product coals have lower volatile loss, lower oxygen and nitrogen content and higher fixed carbon than raw coals treated with hydrogen under the same conditions. Heating the chlorinated coal to a temperature above 500 C in inert gas such as nitrogen results in significantly less desulfurization.

PB82-134875 CP **T02**
Geological Survey, Denver, CO. Geologic Div.
Oil-Shale Fischer Assay Analysis from Selected Coreholes in the Piceance Creek Basin, Colorado.
Data file,
Janet K. Pitman. 1981, mag tape DOI/DF-81/007
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

A magnetic tape consisting of oil-shale Fischer assay data for selected well cores in the Piceance Creek Basin was prepared as a supplement to NTIS tape PB-230 607/AS. Both tapes serve as a data base for calculating oil-shale resources (Pitman, 1981). The tape is in standard IBM format and has the following specifications: EBCDIC (IBM standard), card-image, blocksize 1720 (blocked 20 to 1), record length 86, odd parity, 1,600 bpi, 9-track, no label tape. Each data file on the tape consists of records containing oil-shale analyses for one well core. The first record in a data file consists of a well-core identifier which is a three-digit number preceded by the character 'C'. The second record contains the well name and location, and the remaining records contain Fischer assay data.

PB82-134883 CP **T02**
Geological Survey, Denver, CO. Geologic Div.
Oil-Yield Resources for Oil-Shale Sequences in Core from the Piceance Creek Basin, Colorado, that Average 10, 15, 20, 25, 30, 35, and 40 Gallons per Ton.
Data file,
Janet K. Pitman. 1981, mag tape DOI/DF-81/008
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The Oil-Shale Data Analysis Program developed by the U.S. Geological Survey (Pitman and others, 1972) was designed primarily for the computation of resource estimates from Fischer assay and saline mineral data. Recently, the program was revised by the addition of an algorithm that will compute more systematic and accurate resource values than were previously reported (Watts and VanTrump, 1976). The data on the tape were generated from the algorithm, and consist of tables of oil-shale sequences that maintain specified average oil yields for oil-shale cores in the Piceance Creek Basin, Colorado. Each file corresponds to one well core, and contains a 60 line/page formatted printout of these tables. The tables consist of thickness, value, and resource for oil-shale sequences that maintain an average oil yield of 10, 15, 20, 25, 30, 35, and 40 gallons per ton. Excluded from averages are sequences of lean oil shale greater than 10 feet thick whose minimum oil yield is generally 15 gallons per ton or less. The Fischer assay data used to generate these tables are on magnetic tape available through NTIS report PB-230 607/AS and (Pitman, 1981). In addition to resource evaluation, these data should be useful for delineating minable zones of oil shale that maintain a certain thickness, grade, and resource.

PB82-147190
(Order as PB82-146861, PC **E12**/MF **E12**)
Commission of the European Communities, Luxembourg.
Energy from Biomass by Gasification of Wood and Straw.
1981, 3p
Included in Proceedings of the Coordination Meeting of Contractors 'Energy from Biomass' (Project E) (1st), p280-282 1981. Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

No abstract available.

PB82-153479 PC **A11**/MF **A01**
General Electric Co., Philadelphia, PA.
Marine Biomass Program.
Annual progress rept.,
A. N. Thompkins. 27 Jan 81, 237p GRI-80/0026
Contract GRI-5010-323-0014
Prepared in cooperation with Solar Energy Research Inst., Golden, CO.

The Marine Biomass Program is an integrated research and development program that is directly involved in the development of integrated processes for the growing of a natural resource - in this instance, kelp - specifically for the production of methane as a substitute for natural gas. Previous experimental data has shown that the concept of growing kelp in the open ocean is technically feasible and that methane can be derived by the anaerobic decomposition of this biomass. This report broadens upon this data base, emphasizing the economic as well as the biological and technical requirements that, when solved, will lead to processes for the conversion of kelp to methane that are competitive with other sources of energy.

PB82-861154 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Liquefied Petroleum Gas. June, 1970-January, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jan 82.
Jan 82, 129p
Supersedes PB80-851058.

The storage, transportation, marketing, and safety aspects of liquefied natural gas are presented in the cited reports. Equipment for gas transfer is also included. Methods of measuring mass transfer of liquid in pipelines are discussed, as are methods of sampling for quality control. (This updated bibliography contains 135 citations, 17 of which are new entries to the previous edition.)

PNL-3695(App.A) PC **A07**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Investigations on Catalyzed Steam Gasification of Biomass. Appendix A. Feasibility Study of Methane Production Via Catalytic Gasification of 2000 Tons of Wood Per Day.
L. K. Mudge, S. L. Weber, D. H. Mitchell, L. J. Sealock, Jr., and R. J. Robertus. Jan 81, 135p
Contract AC06-76RL01830

A study has been made of the economic feasibility of producing substitute natural gas (SNG) from wood via catalytic gasification with steam. The plant design in this study was developed from information on gasifier operation supplied by the Pacific Northwest Laboratory (PNL). The plant is designed to process 2000 tons per day of dry wood to SNG. Plant production is 21.6 MM scfd of SNG with a HHV of 956 Btu per scf. All process and support facilities necessary to convert wood to SNG are included. The plant location is Newport, Oregon. The capital cost for the plant is $95,115,000 - September, 1980 basis. Gas production costs which allow for return on capital have been calculated for various wood prices for both utility and private investor financing. For utility financing, the gas production costs are respectively $5.09, $5.56, $6.50, and $8.34 per MM Btu for wood costs of $5, $10, $20, and $40 per dry ton delivered to the plant at a moisture content of 49.50 wt %. For private investor financing, the corresponding product costs are $6.62, $7.11, $8.10, and $10.06 per MM Btu. The cost calculated by the utility financing method includes a return on equity of 15% and an interest rate of 10% on the debt. The private investor financing method, which is 100% equity financing, incorporates a discounted cash flow (DCF) return on equity of 12%. The thermal efficiency without taking an energy credit for by-product char is 58.3%. (ERA citation 06:012174)

RAND/N-1469-DOE PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Values in Conflict: Design Considerations for a Two-Stage Synfuels Development Strategy.
D. Seidman. Apr 80, 38p
Contract AC01-79PE70078

Following President Carter's proposal for a massive crash program of synthetic-fuels development, the Senate approved a more-cautious two-stage development strategy. Some features of the design of a two-stage synfuels development program serving to reduce potential conflict between the values served by synfuels development and other important public values are considered. Section II discusses the potential conflict between synfuels development and values protected or implemented by existing laws and regulations. Section III suggests how the design of the first stage of development might substantially reduce conflict among these values and conflict between synfuels promoters and defenders of other values. It also suggests how first-stage design might help generate information to inform decisions concerning the scope and scale of the second state and facilitate further protection of values in the event of second-stage development. Section IV discusses approaches to avoiding un-

necessary damage to competing values in second-stage planning. It considers approaches to site selection that allow accommodation of national interests and the legitimate interests of the states. It suggests how decisions concerning project-specific waiver of regulatory requirements could minimize damage to competing values. The final section presents general conclusions. (ERA citation 05:033708)

SAN-2165-1 PC **A11**/MF **A01**
General Electric Co., Philadelphia, PA. Re-entry and Environmental Systems Div.
Energy from Marine Biomass. Final Report.
A. N. Tompkins. 20 Mar 79, 245p
Contract ET-78-F-03-2165

The fabrication, assembly and successful deployment of the first open ocean, deep water Biological Test Farm related to the continuing search for alternative energy sources are discussed. This Farm is dedicated to the study of the growth and nutrition of Macrocystis pyrifera (Giant California Kelp) with the far reaching goal of commercializing an ocean grown biomass feedstock for production of substitute natural gas (SNG). The innovative fabrication and vertical deployment of a 1500 foot long, 24 inch diameter flexible pipe for the upwelling of nutrient rich bottom water to the Test Farm was completed. Efforts to develop an optimized marine derived anaerobic culture for the conversion of kelp to methane gas were continued. The successes of this research during 1978 continue to hold promise of maximizing the anaerobic conversion/methane generation process to the theoretical yield limits using marine strains compatible with kelp in the aquatic habitat and with the attendant environmental constraints of the digester. To this end, this research has shown that high salt concentrations, up to 7% can be accomodated, ambient temperature digestion can proceed with no apparent loss in gas production as opposed to the classic mesophilic (37 exp 0 C) process, and the key help constituents, mannitol and algin, are completely utilizable and theoretically convertible to methane. A Gas Cost Analysis was conducted in 1978 as part of the on-going Systems Requirements and Economic Analysis task. This task is designed as a key program tool for coordinating and guiding the experimental and analytical work performed on the Marine Biomass Program. The first-order results of the Gas Cost Analysis indicate that the Marine Biomass SNG costs will be competitive with other SNG sources falling in the range of $3 to $6 per million BTU. The cost could even be less when credits for by-products, such as fertilizer or co-products such as fish and shellfish are included. (ERA citation 05:018525)

SAND-80-0232C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Kinetics and Mechanisms of the Hydroliquefaction of Coal: Illinois No. 6, Burning Star Coal in SRC-II Heavy Distillate.
M. G. Thomas, and T. C. Bickel. 1980, 12p CONF-800929-1
Contract AC04-76DP00789
American Chemical Society fall meeting, San Francisco, CA, USA, 19 Sep 1980.

In order to establish a kinetic model for coal liquefaction, we have endeavored to determine a stepwise reaction mechanism. The proposed first step is the dissolution of coal. Data from microreactor runs in the temperature range 275-375 exp 0 C - below typical liquefaction temperatures - are presented in Table III. There is a small solubility of coal in the solvent at low temperatures, and marked increases at temperatures between 275 exp 0 C and 350 exp 0 C. Equilibrium in terms of gas make and solubility are attained rapidly. Up to 350 exp 0 C, the SRC-II solvent is depleted. Solvent is a reactant with coal. The stoichiometry of the coal-solvent reaction can be estimated by weight loss of solvent and net THF sols. Based upon these data, it appears that the reaction can be represented as 1 Coal + 3 Solvent implies 3 Preasphaltene. This stoichiometry is also consistent with published values for molecular weights of solvent (250), preasphaltene (1000), and coal (2250). The stoichiometry and approximate molecular weights establish a mass balance for the initial dissolution step. It is seen that it is primarily the pentane insoluble fraction of the initial solvent - the heavier, more functional portion - that reacts with coal in this initial reaction. The second reaction step appears to be the decomposition of preasphaltene. (ERA citation 05:031491)

SERI/TR-33-239(V.1) PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Survey of Biomass Gasification. Volume I. Synopsis and Executive Summary.
Jul 79, 45p
Contract EG-77-C-01-4042

Biomass can be converted by gasification into a clean-burning gaseous fuel that can be used to retrofit existing gas/oil boilers, to power engines, to generate electricity, and as a base for synthesis of methanol, gasoline, ammonia, or methane. This survey describes biomass gasification, associated technologies and issues in three volumes. Volume I contains the synopsis and executive summary, giving highlights of the findings of the other volumes. In Volume II, the technical background necessary for understanding the science, engineering, and commercialization of biomass is presented. In Volume III, the present status of gasification processes is described in detail, followed by chapters on economics, gas conditioning, fuel synthesis, the institutional role to be played by the federal government, and recommendations for future research and development. (ERA citation 05:005492)

21E. Jet and Gas Turbine Engines

AD-A108 136/3 PC **A02**/MF **A01**
Naval Weapons Center, China Lake, CA.
Fuel-Rich Plume Combustion.
Annual progress rept. 1 Oct 80-30 Sep 81,
K. C. Schadow, M. J. Lee, and K. J. Wilson. 30 Sep 81, 7p
Report on NAVSEA Propulsion Research Program. See also report dated 30 Sep 80, AD-A096 808.

Experiments are being performed using an axisymmetric gas generator ramjet. Axial and radial profiles of pressure, velocity, turbulence intensity, temperature, and species concentration are being determined using non-interference optical diagnostic techniques (laser doppler velocimeter (LDV)) and intrusive probes. The experimental data are being compared with analytical models developed by Science Application, Inc. (SAI) under an Air Force Office of Scientific Research (AFOSR) contract. An axisymmetric, 5-inch diameter laboratory ramjet combustor was built and checked out. Experiments were initiated using (1) an LDV and a hot-wire anemometer for velocity and turbulence intensity measurements, (2) coated thermocouples for temperature measurement, and (3) a gas chromatograph for analysis of gas samples.

AD-A108 300/5 PC **A17**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Aerodynamics of Power Plant Installation.
Conference proceedings.
Sep 81, 393p Rept no. AGARD-CP-301
Papers presented at the Fluid Dynamics Panel Symposium Held at the Ecole Nationale Superieure de l'Aeronautique et de l'Espace, Complexe Aerospatial de Lespinet, Toulouse, France, 11-14 May 81.

Powerplant installations involve complex flows, strongly influenced by viscous effects and often with important aerodynamic interactions between the airframe and the propulsion system. The introduction of new vehicle propulsion concepts, and new points of emphasis in aircraft and missile design requirements, provide an expanding range of aerodynamic problems which call for both experimental and theoretical study. It was the purpose of the symposium to survey the current and foreseeable aerodynamic problems in powerplant installation and to review recent work which has improved basic understanding or has enhanced prediction and design methods in this field. Since the last AGARD symposium on the subject, in September 1974, there have been many significant developments. The present symposium was organized by FDP with the active support of PEP, in order to draw in contributions from both the airframe and the engine communities and also to provide a forum in which workers in these two communities could exchange ideas and debate interface problems. The presentations were grouped into four sessions under the headings: Combat Aircraft Intakes; Afterbodies and Nozzles; Testing and Analysis Techniques; Installation Aerodynamics of Transport Aircraft. On the final afternoon the symposium concluded with a Round Table Discussion in which progress under each of the four headings was reviewed.

N82-13109/5 PC **A03**/MF **A01**
National Aerospace Lab., Tokyo (Japan).
An Aerodynamic Design and the Overall Stage Performance of an Air-Cooled Axial-Flow Turbine.
A. Yamamoto, K. Takahara, H. Nouse, S. Inoue, and H. Usui. Jan 81, 44p NAL-TR-321T

In order to investigate air-cooled turbines for application to high-temperature engines, a single stage turbine with a 0.56-m (22-inch) tip diameter was designed. The aerodynamical design procedures of the turbine are presented. The stator and rotor blades are characterized by low blade solidity, thick blade section, blunt leading edge and trailing edge, and low blade aspect ratio. A cold air test without supply of cooling air was conducted to determine the turbine aerodynamic performance. The highest efficiency obtained over the range of conditions investigated was 0.865. The turbine satisfied the equivalent design value of specific work output at the design condition (i.e., at equivalent design speed and equivalent design pressure ratio) with an efficiency of 0.856. Detailed surveys of rotor-outlet gas flow were made with Pitot tubes and temperature sensors and the results are also presented.

N82-13112/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Thrust Modulation Methods for a Subsonic V/STOL Aircraft.
R. R. Woollett. 1981, 18p NASA-TM-82747, E-1063
Presented at V/STOL Conf., Palo Alto, Calif., 7-9 Dec. 1981; Sponsored by Aiaa and NASA Ames.

Low speed wind tunnel tests were conducted to assess four methods for attaining thrust modulation for V/STOL aircraft. The four methods were: (1) fan speed change, (2) fan nozzle exit area change, (3) variable pitch rotor (VPR) fan, and (4) variable inlet guide vanes (VIGV). The interrelationships between inlet and thrust modulation system were also investigated using a double slotted inlet and thick lip inlet. Results can be summarized as: (1) the VPR and VIGV systems were the most promising, (2) changes in blade angle to obtain changes in fan thrust have significant implications for the inlet, and (3) both systems attained required level of thrust with acceptable levels of fan blade stress.

N82-13113/7 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Computational Methods for Internal Flows with Emphasis on Turbomachinery.
W. D. Mcnally, and P. M. Sockol. 1981, 79p NASA-TM-82764, E-1085
Presented at the Symp. On Computers in Flow Predictions and Fluid Dyn. Exp. At the Asme Winter Ann. Meeting, Washington, D.C., 15-20 Nov. 1981.

Current computational methods for analyzing flows in turbomachinery and other related internal propulsion components are presented. The methods are divided into two classes. The inviscid methods deal specifically with turbomachinery applications. Viscous methods, deal with generalized duct flows as well as flows in turbomachinery passages. Inviscid methods are categorized into the potential, stream function, and Euler aproaches. Viscous methods are treated in terms of parabolic, partially parabolic, and elliptic procedures. Various grids used in association with these procedures are also discussed.

N82-13114/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
The Effect of Rotor Blade Thickness and Surface Finish on the Performance of a Small Axial Flow Turbine.
R. J. Roelke, and J. E. Haas. 1982, 13p NASA-TM-82726, DOE/NASA/51040-34
Contract DE-AI01-77CS-51040
Prepared in Cooperation with Army Aviation Research and Development Command, Cleveland. Proposed for Presentation at the Gas Turbine Ann. Meeting, London, 18-22 Apr. 1982; Sponsored by Asme.

An experimental investigation was conducted to determine the effect of blade profile inaccuracies and surface finish on the aerodynamic performance of a 11.13 cm tip diameter turbine. The as-received cast rotor blades had a significantly thicker profile than the design intent and a fairly rough surface finish. Stage test results showed an increase of one point in effi-

cieny by smoothing the surface finish and another three points by thinning the blade profiles to near the design profile. Most of the performance gain between the as-cast thick and the thinned rotor blades both with the same surface finish, was attributed to reduced trailing edge losses of the recontoured blades.

N82-13142/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Numerical Analysis of the Scramjet-Inlet Flow Field by Using Two-Dimensional Navier-Stokes Equations.
A. Kumar. Dec 81, 30p NASA-TP-1940, L-14776

A computer code was developed to solve the full two dimensional Navier-Stokes equations in a supersonic combustion ramjet (scramjet) inlet. In order to be able to consider a general inlet geometry with embedded bodies, a numerical coordinate transformation is used which generates a set of boundary-fitted curvilinear coordinates. The explicit finite difference algorithm of MacCormack is used to solve the governing equations. An algebraic, two-layer eddy-viscosity model is used for the turbulent flow. The code can analyze both inviscid and viscous flows with no strut, one strut, or multiple struts in the flow field. The application of the two dimensional analysis in the preliminary parametric design studies of a scramjet inlet is discussed. Detailed results are presented for one model problem and for several actual scramjet-inlet configurations.

N82-13144/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
A Real Time Pegasus Propulsion System Model for VSTOL Piloted Simulation Evaluation.
J. R. Mihaloew, S. P. Roth, and R. Creekmore. 1981, 18p NASA-TM-82770, E-1004
Presented at Vstol Conf., Palo Alto, Calif., 7-9 Dec. 1981; Sponsored by Aiaa and NASA. Ames Research Center.

A real time propulsion system modeling technique suitable for use in man-in-the-loop simulator studies was developd. This technique provides the system accuracy, stability, and transient response required for integrated aircraft and propulsion control system studies. A Pegasus-Harrier propulsion system was selected as a baseline for developing mathematical modeling and simulation techniques for VSTOL. Initially, static and dynamic propulsion system characteristics were modeled in detail to form a nonlinear aerothermodynamic digital computer simulation of a Pegasus engine. From this high fidelity simulation, a real time propulsion model was formulated by applying a piece-wise linear state variable methodology. A hydromechanical and water injection control system was also simulated. The real time dynamic model includes the detail and flexibility required for the evaluation of critical control parameters and propulsion component limits over a limited flight envelope. The model was programmed for interfacing with a Harrier aircraft simulation. Typical propulsion system simulation results are presented.

N82-13145/9 PC **A08**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT.
Sensor Failure Detection System.
Final Report.
E. C. Beattie, R. F. Laprad, M. E. Mcglone, S. M. Rock, and M. M. Akhter. Aug 81, 172p NASA-CR-165515, PWA-5736-17
Contract NAS3-22481
Prepared in cooperation with Systems Control, Inc., Palo Alto, CA.

Advanced concepts for detecting, isolating, and accommodating sensor failures were studied to determine their applicability to the gas turbine control problem. Five concepts were formulated based upon such techniques as Kalman filters and a screening process led to the selection of one advanced concept for further evaluation. The selected advanced concept uses a Kalman filter to generate residuals, a weighted sum square residuals technique to detect soft failures, likelihood ratio testing of a bank of Kalman filters for isolation, and reconfiguring of the normal mode Kalman filter by eliminating the failed input to accommodate the failure. The advanced concept was compared to a baseline parameter synthesis technique. The advanced concept was shown to be a viable concept for detecting, isolating, and accommodating sensor failures for the gas turbine applications.

N82-13146/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Nasa Research in Aircraft Propulsion.
M. A. Beheim. 1982, 17p NASA-TM-82771, E-1096
Proposed for Presentation at the 27TH Ann. Intern. Gas Turbine Conf., London, 18-22 Apr. 1982; Sponsored by Asme.

A broad overview of the scope of research presently being supported by NASA in aircraft propulsion is presented with emphasis on Lewis Research Center activities related to civil air transports, CTOL and V/STOL systems. Aircraft systems work is performed to identify the requirements for the propulsion system that enhance the mission capabilities of the aircraft. This important source of innovation and creativity drives the direction of propulsion research. In a companion effort, component research of a generic nature is performed to provide a better basis for design and provides an evolutionary process for technological growth that increases the capabilities of all types of aircraft. Both are important.

N82-13509/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Gas-Turbine Critical Research and Advanced Technology Support Project.
Annual Report.
J. S. Clark, P. E. Hodge, C. E. Lowell, D. N. Anderson, and D. F. Schultz. Mar 81, 50p NASA-TM-81708, DOE/NASA/2593-24
Contract DE-AI01-77ET-10350

A technology data base for utility gas turbine systems capable of burning coal derived fuels was developed. The following areas are investigated: combustion; materials; and system studies. A two stage test rig is designed to study the conversion of fuel bound nitrogen to NOx. The feasibility of using heavy fuels in catalytic combustors is evaluated. A statistically designed series of hot corrosion burner rig tests was conducted to measure the corrosion rates of typical gas turbine alloys with several fuel contaminants. Fuel additives and several advanced thermal barrier coatings are tested. Thermal barrier coatings used in conjunction with low critical alloys and those used in a combined cycle system in which the stack temperature was maintained above the acid corrosion temperature are also studied.

PATENT-4 294 135 Not available NTIS
Department of the Navy, Washington, DC.
Turbomachine Balance Correction System.
Patent.
Robert P. Tameo. Filed 21 Jan 79, patented 13 Oct 81, 4p AD-D009 017/5, PAT-APPL-6-004 248
Supersedes PAT-APPL-6-004 248.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A balance system for rotating turbomachinery and other rotating devices is provided wherein balance correction is obtained by snap rings having both an intentional eccentricity of their center of mass and discrete peripheral features which are adapted to be received in corresponding recesses in the machinery. (Author)

21G. Reciprocating Engines

N82-13432/1 PC **A08**/MF **A01**
Staatliches Forschungsinstitut fuer Geochemie, Bamberg (Germany, F.R.).
Examination of Early Wear Detection in Diesel Engines by Energy Dispersive Radioisotope X Ray Fluorescence Analysis Untersuchungen Zur Schadensfrueherkennung bei Dieselmotoren MIT Hilfe der Energiedispersiven Radionuklid-Roentgenfluoreszenzanalyse.
H. Meier, E. Unger, W. Albrecht, N. Geheeb, and W. Hecker. 1979, 152p BMVG-FBWT-79-19
In German; English Summary. Sponsored by Bundesministerium der Verteidigung.

The application of X-ray spectroscopy for monitoring wear-metal particles in lubricating oils is considered. The principles of an energy dispersive X-ray analytical arrangement consisting of radioistope sources or small, thin target, X-ray tubes for excitation in connection with detection for selection of fluorescent X-rays, are explained. Analytical relationships, basic equations, parameters for optimizing the spectroscope setup, and problems concerning the preparation of oil samples are discussed. Experiments with organometallic compounds as standards show that by using radioisotopes and portable, thin target, X-ray tubes, respectively in combination with solid state detectors, wear metals can be directly analyzed in lubricating oil samples at the 1.5 to 20 ppm level (Fe: 1.4 ppm; Pb: 5.0 ppm; Cr: 2.2 ppm; Ni: 3.6 ppm). After collecting thin layers of wear particles on filters, detection limits at the 0.2 to 1 ppm level (10 ml oil samples) can be obtained.

N82-13827/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Determination of Two-Stroke Engine Exhaust Noise by the Method of Characteristics.
A. D. Jones, and G. L. Brown. Jun 81, 48p NASA-TM-84061
Prepared in cooperation with Adelaide Univ. (Australia).

A computational technique was developed for the method of characteristics solution of a one-dimensional flow in a duct as applied to the wave action in an engine exhaust system. By using the method, it was possible to compute the unsteady flow in both straight pipe and tuned expansion chamber exhaust systems as matched to the flow from the cylinder of a small two-stroke engine. The radiated exhaust noise was then determined by assuming monopole radiation from the tailpipe outlet. Very good agreement with experiment on an operation engine was achieved in the calculation of both the third octave radiated noise and the associated pressure cycles at several locations in the different exhaust systems. Of particular interest is the significance of nonlinear behavior which results in wave steepening and shock wave formation. The method computes the precise paths on the x-t plane of a finite number of C(sub +), C(sub -) and P characteristics, thereby obtaining high accuracy in determining the tailpipe outlet velocity and the radiated noise.

TE-4257-72-80 PC **A03**/MF **A01**
Thermo Electron Corp., Waltham, MA.
Status Report on Diesel Organic-Rankine Compound Engine for Long-Haul Trucks.
Oct 79, 33p CONF-791082-2
Contract AC02-76CS52832
DOE automotive technology development contractors coordination meeting, Dearborn, MI, USA, 23 Oct 1979.

A completely integrated compound engine, consisting of a diesel engine coupled to a Rankine engine, which operates on the exhaust heat from the diesel engine has been developed and demonstrated. The prototype compound engine is built around a standard Mack Truck diesel engine, and the waste heat recovery system is a Thermo Electron organic-Rankine bottoming cycle system incorporating a turbine expander delivering power to the diesel engine drive train. The most attractive use of the diesel organic-Rankine compound engine is in large, heavy-duty trucks for long-distance hauling. Here the engine load and speed requirements are nearly constant over a large portion of the operating hours, and high mileages are accumulated. Thus, the potential fuel savings is sufficient to justify the added cost of a bottoming cycle system. Based on engine dynamometer tests to date, the addition of an organic-Rankine bottoming cycle to a long-haul diesel truck can improve the fuel economy by 15% over a typical duty cycle. Utilizing a chassis-mounted dynamometer, baseline performance testing was completed on the compound engine installed in the truck. Checkout road tests were then completed at TECO prior to delivery of the truck to Mack Truck's Engineering Development and Test Center for further testing. Over 600 hours of endurance testing have been completed to date on a second compound engine installed on a facility dynamometer. Design of a new integrated power conversion unit is nearing completion and installation drawings are being prepared. (ERA citation 05:033819)

21H. Rocket Motors and Engines

AD-A108 137/1 PC **A02**/MF **A01**
Naval Weapons Center, China Lake, CA.
Energy Contributions Associated with Combustion Instability.
Annual progress rept. 1 Oct 80-30 Sep 81,
H. B. Mathes. 30 Sep 81, 9p
Report on NAVSEA Propulsion Research Program. See also report dated 30 Sep 80, AD-A096 806.

The investigation of new and novel laboratory test techniques for determining the acoustic energy contributions of burning propellants will be pursued. Emphasis will be on methods that provide a more direct measurement than presently employed. Initial effort will be focused on methods for directly determining the response of solid propellant combustion to incident acoustic pressure waves. If successful, the method, or methods, for pressure-coupled measurement will be modified to provide direct velocity-coupled response measurements. These methods are expected to lower the cost of characterizing the acoustic combustion response of solid propellant formulations of interest to the Navy and to provide improved accuracy of measurement.

AD-A108 224/7 PC **A11**/MF **A01**
Thiokol Corp., Huntsville, AL. Huntsville Div.
User's Manual for Solid Propulsion Optimization Code (SPOC). Volume I. Technical Description.
Rept. for 28 Mar 80-21 Aug 81,
G. P. Roys. Aug 81, 244p U-81-4457A, AFRPL-TR-81-70-VOL-1
Contract F04611-80-C-0016
See also Volume 2, AD-A108 225.

Contents: Motor and Problem Definition; Computer Code Arrangement; Optimization Process; Performance Requirements; Design Constraints and Operating Limits; Payoff Parameters; Limitations and Accuracy; Motor Geometry; Analysis Routines; Impulse Efficiency; Nozzle Structural and Ablative Thickness; Pressure Vessel Structural Analysis; Propellant Structural Analysis; Trajectory Simulation; Cost; Combustion Stability Analysis; Weights; Miscellaneous; User Models; and Error Messages.

AD-A108 225/4 PC **A10**/MF **A01**
Thiokol Corp., Huntsville, AL. Huntsville Div.
User's Manual for Solid Propulsion Optimization Code (SPOC). Volume II. User's Guide.
Special rept. Feb 80-Aug 81,
G. P. Roys. Aug 81, 211p U-81-4457B, AFRPL-TR-81-70-VOL-2
Contract F04611-80-C-0016
See also Volume 3, AD-A108 226.

Contents: Motor and Problem Definition; Grain Type 1 - Star; Grain Type 2 - Wagon Wheel; Grain Type 3 - Finocyl; Grain Type 4 - Conocyl; Grain Type 5 - CP; Nozzle Verification; Inputs for Ballistic Simulation; Thermochemical Analysis; Performance Requirements and Design Constraints; Ballistic Simulation; Comparison with Requirements and Constraints; Nozzle Analysis Results; Case Structural Analysis; Propellant Structural Analysis; Trajectory Simulation; Cost Analysis; Combustion Stability Analysis; Summary Output, and User-Supplied Models.

AD-A108 226/2 PC **A03**/MF **A01**
Thiokol Corp., Huntsville, AL. Huntsville Div.
User's Manual for Solid Propulsion Optimization Code (SPOC). Volume III. Program Description.
Special rept. Feb 80-Aug 81,
G. P. Roys. Aug 81, 28p U-81-4457C, AFRPL-TR-81-70-VOL-3
Contract F04611-80-C-0016
See also Volume 1, AD-A108 224.

Contents: Subroutine Description; Subroutine Cross-Index; Subroutine-Common Cross-Index; and Subroutine Flow Charts.

AD-A108 634/7 PC **A03**/MF **A01**
Thiokol Corp., Huntsville, AL. Huntsville Div.
Advanced Air Launched Missile Motor Design Methods.
Final rept. 21 Jan 80-4 Sep 81,
G. P. Roys. Sep 81, 46p U-81-17A, AFRPL-TR-81-69
Contract F04611-80-C-0016

This report is the final report of a three-phase project whose objective was to formulate a computer code to perform detailed preliminary designs of solid propellant rocket motors. All major components and performance of a motor are mathematically modeled using source dimensions and characteristics. A direct pattern search non-linear optimization scheme based on the Hooke and Jeeves algorithm is employed to establish motor characteristics that optimize any one of several performance parameters. Constraints imposed during the optimization process are basic performance requirements, design constraints and operating limits. Decision variables during optimization are propellant formulation, propellant burn rate, propellant grain dimensions, nozzle dimensions, and pressure vessel dimensions. Provisions are made for easily inserted user-defined models of several characteristics. (Author)

AD-A108 659/4 PC **A04**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Exact Involute Bodies of Revolution.
Interim technical rept. Jun 79-Jun 80,
Nicholas J. Pagano. May 81, 53p Rept no. AFWAL-TR-80-4152

Involute construction is an approach used in contemporary rocket nozzle technology for the fabrication of exit cones and other bodies of revolution and consists of laminating identical composites sheets of uniform thickness along curved surfaces, called involute surfaces. In this work, we shall derive the exact solution for these surfaces, which guarantees that the volume of the body being generated is precisely filled, with no gaps or overlaps. We also present the equations of the developed surface, or ply pattern, a formulation of the kinematics of the fabrication debulking process, and an experimental validation of the theoretical work.

N82-13427/1 PC **A10**/MF **A01**
Aerojet Nuclear Systems Co., Sacramento, CA.
Low-Thrust Chemical Propulsion System Pump Technology.
Final Report.
R. L. Sabiers, and A. Siebenhaar. Mar 81, 201p
NASA-CR-165219
Contract NAS3-21960

Candidate pump and driver systems for low thrust cargo orbit transfer vehicle engines which deliver large space structures to geosynchronous equatorial orbit and beyond are evaluated. The pumps operate to 68 atmospheres (1000 psi) discharge pressure and flowrates suited to cryogenic engines using either LOX/methane or LOX/hydrogen propellants in thrust ranges from 445 to 8900 N (100 to 2000 lb F). Analysis of the various pumps and drivers indicate that the low specific speed requirement will make high fluid efficiencies difficult to achieve. As such, multiple stages are required. In addition, all pumps require inducer stages. The most attractive main pumps are the multistage centrifugal pumps.

PAT-APPL-6-300 766 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Constant Thrust Hybrid Rocket Motor.
Patent Application,
Allen L. Holzman. Filed 10 Sep 81, 15p AD-D009 044/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The constant thrust hybrid rocket motor of this invention is capable of providing operation for at least 50 seconds over a wide temperature range and with minimal variation in chamber pressure. The constant thrust hybrid rocket motor of this invention includes a combustion chamber containing a Plexiglas grain having at least one longitudinal port, an ignition squib associated therewith to ignite the hybrid rocket motor, an oxidizer source, a squib valve, a pressure regulator, and a solenoid valve, all elements being of the type disclosed in U.S. Patent No. 3,156,092 referred to hereinabove. In addition thereto, and forming the inventive concept of the constant thrust hybrid rocket motor of this invention are means for creating a bypass around the solenoid valve. This may be accomplished by the utilization of an actual bypass line having a fixed sized orifice in conjunction with a conventional solenoid valve and feedback transducer, or by incorporating within the hybrid rocket motor a unique solenoid valve which contains therein a constant flow orifice in combination with a feedback transducer.

21I. Rocket Propellants

AD-A108 135/5 PC **A02**/MF **A01**
Naval Weapons Center, China Lake, CA.
Decomposition and Interaction of Propellant Ingredients.
Annual progress rept. 1 Oct 80-30 Sep 81,
K. J. Kraeutle, and T. L. Boggs. 30 Sep 81, 7p
Report on NAVSEA Propulsion Research Program. See also report dated 30 Sep 80, AD-A096 807.

The program utilizes a wide variety of experimental methods as well as theoretical studies in specific areas such as burn rate modeling. These methods have been well documented in numerous presentations, publications, and patents. They allow the study of catalyzed and uncatalyzed decomposition of propellant oxidizers, binders, and metal fuels, and the evaluation of combustion characteristics, combustion performance, and combustion stability of experimental and production lot propellants. Where required, established test methods are modified or new methods are developed to meet specific needs such as in particle size analysis or ingredient modification. In-house or commercial analytical capabilities are employed whenever feasible or promising. The interpretation of results is facilitated by limiting the number of sample and test parameters as much as possible and by rigorous control of test variables. In the process, new options for tailoring of propellant combustion behavior, new propellant systems, and quality control of ingredients are evolved. (Author)

N82-13254/9 PC **A04**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Test Number 2 of Propellants for Rocket Motor E573.
A. Schwartz. May 81, 51p FOA-C-20411-D1
In Swedish; English Summary.

The propellants tested are 85 months old. Properties were compared with properties from the first test on 32 months old propellants. Chemical stability is good. Tensile tests show small changes at low temperatures and high strain rates. The propellants possibly become a little stiffer. The adhesion of the inhibitor decreases considerably, especially the adhesion to propellant D23 where a decrease of about 43% was measured. The adhesion to propellant D28 decreases about 17%. Hardness and burning rate are not altered.

PAT-APPL-6-300 761 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Copper Containing Ballistic Additives.
Patent Application,
Robert C. Corley. Filed 10 Sep 81, 18p AD-D009 040/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

In accordance with this invention, it has been found that the addition of certain copper compounds to solid propellant composition can materially increase the burning rate of the propellant grains while simultaneously reducing the pressure exponent in the rocket motor chamber. The copper compounds are simple salts, and various types of chelates. In a baseline 88 weight percent solid propellant formulation, the copper compounds of this invention exhibited ballistic characteristics covering burn rates up to 1.5 in/sec at 1000 psia and pressure exponents down to 0.15. Accordingly, the primary object of this invention is to develop a concept of incorporating copper compounds into solid rocket propellant formulations for use as burning rate modifiers. Another object of this invention is to provide ballistic additives that are capable of increasing the burning rate of solid propellant grains while simultaneously decreasing their pressure exponent.

PAT-APPL-6-300 764 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Non-Catalytic Hydrazine Thruster.
Patent Application,
Walter S. Davis. Filed 10 Sep 81, 22p AD-D009 043/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention concerns itself with a nominal 5 lbF thrust attitude control engine which derives its thrust from the non-catalytic decomposition of hydra-

zine. In essence, the thruster of this invention is composed of an elongated cylindrical, pressure chamber having an elongated cylindrical heating well positioned within the center of the chamber along its longitudinal axis. An electrical heater is positioned within the well. The chamber is operationally connected to a source of hydrazine which enters the chamber through an injection tube positioned tangential to the interior surface of the chamber. The configuration and position of the injector tube as well as the heating means are critical components of the thruster of this invention. These essential elements, with their unique placement and configuration, are responsible for providing the long life, high thrust and the means for maintaining the thruster at the temperature level necessary for successful pulsed as well as steady state operation. Accordingly, the primary object of this invention is to provide a monopropellant hydrazine thruster capable of operating at a 5 lbF nominal thrust level with a 3 to 1 blow-down range.

22. SPACE TECHNOLOGY

22A. Astronautics

AD-A108 554/7 PC **A09**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
ACOSS Eight (Active Control of Space Structures), Phase II.
Final technical rept. May 80-Apr 81,
Ralph P. Iwens, Robert J. Benhabib, and Frank C. Tung. Sep 81, 185p TRW-36296-6001-UT-00, RADC-TR-81-242
Contract F30602-80-C-0198, ARPA Order-3654

This effort addresses three areas of active structure control/vibration control: (1) Stability ensuring designs in the presence of modal truncation/inaccurate structural models using a method based on the positivity of operators; (2) On-orbit parameter identification using the maximum likelihood method; and (3) Trade-offs between model reference adaptive control and fixed gain control with and without on-orbit parameter identification and system tuning. Developed a stability ensuring design methodology which does not rely on modal truncation, has only low sensitivity to the exact knowledge of the structures model and, with some modifications, can be extended to non-linear systems. The method yields good performance, but is not necessarily optimal. Studied the maximum likelihood method of parameter identification. Parameter data collected on-orbit could be used to up-date the control model and improve performance. An alternative to explicit parameter identification and subsequent system tuning is direct adaptive control. Trade-offs between parameter identification and tuning versus adaptive controls were coordinated and the results are presented.

AD-A108 629/7 PC **A09**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
ACOSS Eight (Active Control of Space Structures), Phase II.
Final technical rept. May 80-Apr 81,
Ralph P. Iwens, Robert J. Benhabib, and Frank C. Tung. Sep 81, 184p TRW-36296-6001-UT-00-PH-2, RADC-TR-81-242-PH-2
Contract F30602-80-C-0198, ARPA Order-3654

This effort addresses three areas of active structure control/vibration control: (1) Stability ensuring designs in the presence of modal truncation/inaccurate structural models using a method based on the positivity of operators; (2) On-orbit parameter identification using the maximum likelihood method; and (3) Trade-offs between model reference adaptive control and fixed gain control with and without on-orbit parameter identification and system tuning. Developed a stability ensuring design methodology which does not rely on modal truncation, has only low sensitivity to the exact knowledge of the structures model and, with some modifications, can be extended to non-linear systems. The method yields good performance, but is not necessarily optimal. The maximum likelihood method of parameter identification was studied. Parameter data collected on-orbit could be used to up-date the control model and improve performance. An alternative to explicit parameter identification and subsequent system tuning is direct adaptive control. Trade-offs between parameter identification and tuning versus adaptive controls were coordinated and the results are presented. (Author)

N82-13164/0 PC **A04**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Raumfahrt.
Concept and Feasibility Study (Phase A) for the X-Ray Satellite Robisat. Executive Summary.
Final Report.
G. Barthel, W. Brunner, J. Doenecke, E. Eichhorn, and H. Hufnagel. Dec 80, 72p BMFT-FB-W-80-027, ISSN-0170-1339
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The feasibility of launching a reusable satellite from a space shuttle which meets high performance characteristics connected with a one-year sky mapping mission of soft X-ray sources in the spectral range between 0.1 and 2.0 keV is studied. The core instrument of the satellite is an 80 cm Wolter telescope. Possible concept alternatives for the telescope, satellite design, orbit parameters, and telemetry are discussed. An optimized concept is presented and its integration and test program are indicated. The cost analysis indicates that this satellite can be built within the limits set by the low program cost requirements.

N82-13765/4 PC **A03**/MF **A01**
Intermetrics, Inc., Huntsville, AL.
SEPAC Software Configuration Control Plan and Procedures, Revision 1.
15 May 81, 40p NASA-CR-161915, IR-834-1
Contract NAS8-33806

SEPAC Software Configuration Control Plan and Procedures are presented. The objective of the software configuration control is to establish the process for maintaining configuration control of the SEPAC software beginning with the baselining of SEPAC Flight Software Version 1 and encompass the integration and verification tests through Spacelab Level IV Integration. They are designed to provide a simplified but complete configuration control process. The intent is to require a minimum amount of paperwork but provide total traceability of SEPAC software.

N82-14047/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Edwards, CA. Hugh L. Dryden Flight Research Center.
Report on Research and Technology-FY 1981.
Annual Report.
Nov 81, 39p NASA-TM-81367

More than 65 technical reports, papers, and articles published by personnel and contractors at the Dryden Flight Research Center are listed. Activities performed for the Offices of Aeronautics and Space Technology, Space and Terrestrial Applications, Space Transportation Systems, and Space Tracking and Data Systems are summarized. Preliminary stability and control derivatives were determined for the shuttle orbiter at hypersonic speeds from the data obtained at reentry. The shuttle tile tests, spin research vehicle nose shapes flight investigations, envelope expansion flights for the Ames tilt rotor research aircraft, and the AD-1 oblique wing programs were completed as well as the KC-135 winglet program.

22B. Spacecraft

N82-13160/8 PC **A02**/MF **A01**
Academia Sinica, Beijing (China). Space Science and Technology Center.
Satellite Attitude Control with Decomposed Controller.
Y. Shao-hua. 1 Jul 81, 22p LOG-G668
Backup Document for Aiaa Synoptic Scheduled for Publication in Journal of Guidance and Control on Jan./Feb. 1982.

A concept is presented to solve the gyroscopic coupling problem of satellite attitude control. Control theory is used in the problem formulation and solution. Optimal decoupling control, wheel momentum tracking, and stochastic correction control and estimation are features of the concept. The systems structure of the concept is recommended for various attitude control and estimation problems. The performance obtained from computer simulation showed potential for practical application.

N82-13161/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cocoa Beach, FL. John F. Kennedy Space Center.
Launch Mission Summary: Intelsat 5 (F3) Atlas/Centaur-55.
30 Nov 81, 14p NASA-TM-84068, KSC-GP-15-23

Intelsat 5 (F3) spacecraft, launch vehicle, and mission are described. Information relative to launch windows, flight plan, radar and telemetry coverage, selected trajectory information, and a brief sequence of flight events is provided.

N82-13162/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Mission Operation Report: Intelsat V-C(F-3).
1981, 22p NASA-TM-84072, O-491-203-81-03

This third in a series of improved INTELSAT commercial communication satellites has a cpaa capacity of 12,000 voice circuits plus two television channels. An Atlas-Centaur vehicle inserts the satellite into a transfer orbit which enables the spacecraft apogee motor to inject the satellite into a synchronous orbit. The dimensions, general characteristics, and communications features are summarized. The maritime communications subsystems and the communications payload are described. Telemetry, tracking and command, propulsion, electric power, and the launch vehicle characteristics are also discussed.

N82-13166/5 PC **A08**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Shape Determination and Control for Large Space Structures.
C. J. Weeks. 1 Oct 81, 175p JPL-PUB-81-71
Contract NAS7-100

An integral operator approach is used to derive solutions to static shape determination and control problems associated with large space structures. Problem assumptions include a linear self-adjoint system model, observations and control forces at discrete points, and performance criteria for the comparison of estimates or control forms. Results are illustrated by simulations in the one dimensional case with a flexible beam model, and in the multidimensional case with a finite model of a large space antenna. Modal expansions for terms in the solution algorithms are presented, using modes from the static or associated dynamic mode. These expansions provide approximated solutions in the event that a used form analytical solution to the system boundary value problem is not available.

N82-13764/7 PC **A06**/MF **A01**
McDonnell Douglas Astronautics Co.-West, Huntington Beach, CA.
Statistical Energy Analysis Computer Program, User's Guide.
R. W. Trudell, and L. I. Yano. Nov 81, 118p NASA-CR-161913, MDC-G9915
Contract NAS8-33191

A high frequency random vibration analysis, (statistical energy analysis (SEA) method) is examined. The SEA method accomplishs high frequency prediction of arbitrary structural configurations. A general SEA computer program is described. A summary of SEA theory, example problems of SEA program application, and complete program listing are presented.

22C. Spacecraft Trajectories and Reentry

AD-A108 477/1 PC **A07**/MF **A01**
Analytic Services, Inc., Arlington, VA.

The Prediction of Satellite Ephemeris Errors as They Result from Surveillance System Measurement Errors.
Space division note,
Bowen Eugene Simmons. Aug 81, 138p Rept no. ANSER-SPDN-80-4
Contract F49620-77-C-0025

This report derives equations predicting satellite ephemeris error as a function of measurement errors of space-surveillance sensors. These equations lend themselves to rapid computation with modest computer resources. They are applicable over prediction times such that measurement errors, rather than uncertainties of atmospheric drag and of Earth shape, dominate in producing ephemeris error. This report describes the specialization of these equations underlying the ANSER computer program, SEEM (Satellite Ephemeris Error Model). The intent is that this report be of utility to users of SEEM for interpretive purposes, and to computer programmers who may need a mathematical point of departure for limited generalization of SEEM. (Author)

N82-13383/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Aerodynamic Heating on the Corrugated Surface of a 10.2 Deg Half-Angle Blunted Cone at Mach 6.7.
I. Weinstein, D. E. Avery, and L. R. Hunt. Dec 81, 45p NASA-TP-1928, L-14679

A 10.2 deg half-angle blunted cone with corrugated surfaces was tested in the Langley 8-foot high-temperature structures tunnel to measure the aerodynamic heating of its surfaces. The tests were made in a turbulent boundary layer at angles of attack of 0 deg, 5 deg, and 10 deg. Heating of the windward side was in reasonable agreement with theoretical turbulent predictions for a smooth cone, while heating on the leeward side was between laminar and turbulent predictions as a result of local transitional flow or flow separation produced by high lee-side pressures. Localized heating measurements indicated a significant increase in heating at large cross-flow angles, with the maximum heating rates occurring where the flow reattaches on the upstream side of the corrugation crest and the minimum occurring on the downstream side where the flow is separated.

KEYWORD INDEX

NTIS®

Index entries in this section are selected to indicate important ideas and concepts presented in a report. When using the keyword index, be sure to look under terms narrower, broader, or related to a particular topic. Although some of the keywords are not selected from a controlled vocabulary of terms, most of them have been selected from the DoD, DoE, NASA, or NTIS controlled vocabularies. The entries are arranged by keyword and then by the NTIS order number.

SAMPLE ENTRY

FAST FOURIER TRANSFORMATIONS
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm.
PB80-104045 33

Keyword term
Title
NTIS order number Page number

8TH AVENUE RESERVOIR
National Program of Inspection of Non-Federal Dams, Tennessee. 8th Avenue Reservoir (Inventory Number TN 03719), Cumberland River Basin, Nashville, Davidson County, Tennessee. Phase I Investigation Report,
AD-A108 470/6 1593

ABSORBERS (MATERIALS)
Regenerative CO2 Absorbent.
PATENT-4 285 918 1542

ABSORPTION
Measurement of Tampon Absorbency; Evaluation of Tampon Brands.
PB82-147331 1533

Measurement of Tampon Absorbency; Test Method Evaluation.
PB82-147349 1533

ABSORPTION COEFFICIENTS
High Temperature in Absorption Measurements.
AD-A108 601/6 1541

ABSORPTION SPECTROSCOPY
Computer Programs in BASIC Language for Graphite Furnace Atomic Absorption Using the Method of Additions. Part 1. Operating Instructions.
UCRL-52810(Pt.1) 1545

Computer Programs in BASIC Language for Graphite Furnace Atomic Absorption Using the Method of Additions. Part 2. Documentation.
UCRL-52810(Pt.2) 1545

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The Shock and Vibration Digest. Volume 13, Number 11,
AD-A108 290/8 1642

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An Improved Stress Corrosion Test Medium for Aluminum Alloys.
N82-13216/8 1580

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Influence of Sine, and Random, Whole-Body Vibration on Visual Acuity Einfluss Sinusloermiger und Regelloser Ganzkoerperschwingungen Auf die Visuelle Informationsaufnahme.
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Highway Accident Report: ARA Services, Inc., Tour Bus Denali National Park and Preserve (Mt. McKinley National Park), Alaska, June 15, 1981.
PB82-131707 1607

ACCIDENTS
Review of ARAC'S Involvement in the Titan II Missile Accident.
UCID-18833 1616

ACCOUNTING
Better Accountability Procedures Needed in NSF and NIH Research Grant Systems.
AD-A108 393/0 1492

United States General Accounting Office Publications List.
AD-A108 538/0 1496

Computerized Management Report System for Monitoring Manpower and Cost.
ORNL-5277 1494

An Evaluation of the Implementation of the Standard Accounting and Reporting System.
PB82-147943 1496

ACCURACY
A Comparison of Three Programs for the Calculation of Surface-Ratio en Jaemfoerelse AV Tre Program Foer Beraekning AV 'Ytfoerhaallanden'.
N82-13779/5 1616

ACETOAMINOPHEN
Acetoaminophen: Metabolism and Toxicity. 1978-January, 1982 (Citations from the Information Retrieval, Ltd. Data Base).
PB82-861436 1534

ACETYLENE
Ions in Fuel-Rich and Sooting Acetylene and Benzene Flames.
AD-A108 487/0 1646

Cure Retarding Additives for Acetylene-Terminated Polymers.
PAT-APPL-6-300 838 1582

ACIDS
Effects of Acid and Bile Salts on the Rabbit Esophageal Mucosa.
AD-A108 319/5 1535

ACOUSTIC ABSORPTION
Differential Sound Absorption Technique and Effect of Ion-Pairing and Pressure on Sound Absorption in Seawater and Aqueous Mixtures of Magnesium Sulfate and sodium Chloride.
AD-A108 569/5 1636

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Acoustic Targeting System for Off-Axis Firing.
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Site Occupancy Detector.
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Modified Ambient Sea Noise Indicator with Ambient Noise Directionality Estimator.
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Proceedings of the DARPA/AFWAL Review of Progress in Quantitative Nondestructive Evaluation, held 14-18 July 1980, Scripps Institution of Oceanography, La Jolla, California.
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PAT-APPL-6-314 929 1602

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On the Use of Doppler Sonar for Internal Wave Measurements.
AD-A108 712/1 1547

Comparison of Various Methods for Predicting the Loudness and Acceptability of Noise. Part II. Effects of Spectral Pattern and Tonal Components,
PB82-138702 1502

ACOUSTIC MEASUREMENTS
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N82-13828/0 1636

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ACOUSTIC SCATTERING
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ACOUSTIC SURFACE WAVES
Acoustic Surface Waves. April, 1976-November, 1981 (Citations from the NTIS Data Base).
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N82-13138/4 1484

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N82-13147/5 1482

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N82-13150/9 1483

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SAND-80-0245C 1634

ADAPTIVE COMMUNICATION
Adaptive Communication. 1970-January, 1982 (Citations from the NTIS Data Base).
PB82-862079 1620

ADAPTIVE CONTROL SYSTEMS
ACOSS Eight (Active Control of Space Structures), Phase II.
AD-A108 554/7 1652

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Longterm Durability of Structural Adhesives for Wood: Results after 10 Years Exposure (Langtidsbestandighet av lim for Baerende Trekonstruksjoner: Resultater etter 10 Ars Eksponering).
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N82-13396/8 1482

AERODYNAMIC HEATING
Aerodynamic Heating on the Corrugated Surface of a 10.2 Deg Half-Angle Blunted Cone at Mach 6.7.
N82-13383/6 1653

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An Analytical and Experimental Study of the Steady and Unsteady Airloads on a Wing with Oscillating Control Including a Streamlined Gap.
N82-13119/4 1482

AERODYNAMIC LOADS
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AERODYNAMIC STALLING
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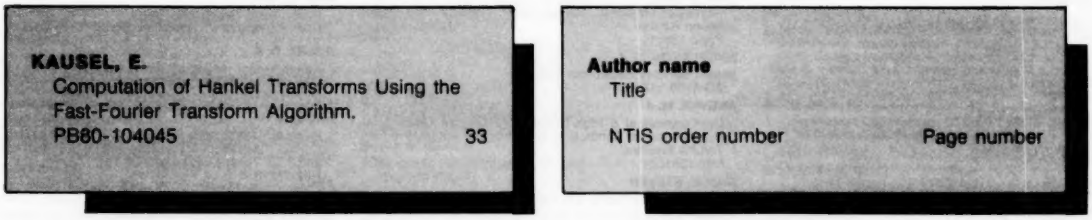

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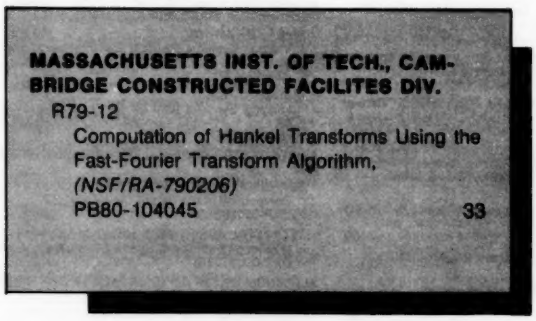

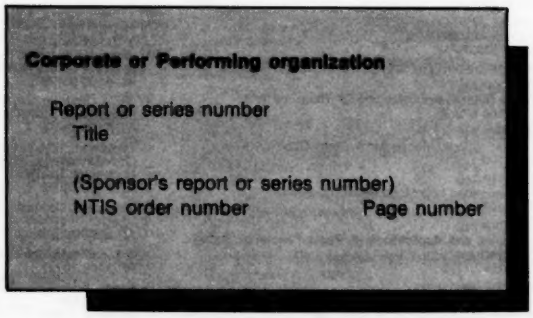

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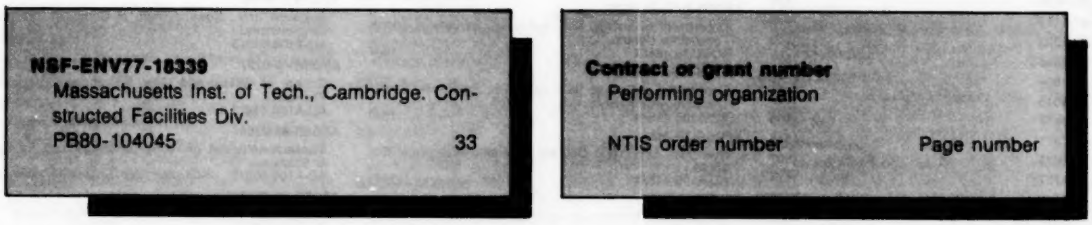

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